INSTRUCTION MANUAL

JM450

VERSION:IMM450AE3

PREFACE

Thank you for purchasing the CNC MACHINE TOOL CENTER. We at KENT are confident your purchase will greatly expand your work capacity and efficiency. This issue has been prepared to assist you on ordering replacement, servicing parts, technical problem for the type of V450. Due to constant improvement in design, you may find slight variations from the machine delivered to you. This merely indicates that equipment improvements have been made to better meet your requirements. If you have any question on your machine or this publication, please contact your *KENT dealer* or *local agent*

CHANGES AND COPYING

CONTENT

1 SAFETY PRECAUTIONS

This machine is provided with a number of safety devices to protect personnel and equipment from injury and damage. Operators should not, however, rely solely upon these safety devices but should operate the machine after fully understanding what special precautions to take by reading the following statements thoroughly.

1-1 However, safe operation cannot be ensured if operators use a CNC Machine Center improperly or do not follow safety rules properly. Failure to comply with these rules may result in death, injury, or damage to the machine and/or products. In addition to the safety information in this manual, common sense tells us there are many "Don'ts" when operating a machine. Unless an operation is specifically stated in this instruction manual, consider that operation a "Don't".

1-1-1 The basic condition given below must always be strictly followed.

- Only qualified personnel are permitted to maintain and/or operate this machine.
- Read the instruction manual thoroughly and make sure the contents are completely understood in order to operate a machine efficiently and safely.
- Always keep this safety paragraph and the instruction manual at a designated place near the machine so that they can be easily accessed whenever required.
- Use safety shoes that are not damaged by oil, safety goggles with side covers, safety clothes and other safety protection.
- A senior qualified person must keep keys.
- Be sure there are no articles around the machine.
- Turn off the power source before leaving, checking and daily work.
- All persons concerned with operation and maintenance of this machine must be aware of the emergency stop buttons and switches' location, functions and operation.
- In the event of power failure, turn off the circuit breaker immediately.
- Use the recommended hydraulic oils, lubricants and grease or acceptable equivalents.
- Replacement fuses should have the proper current ratings.
- Protect the NC unit, operating panel, electric control panel, etc., from shocks, since this could cause a failure or malfunction.
- Do not change parameters, volumes and other electrical settings unnecessarily. If such changes are unavoidable, record the values prior the change so that they can be returned to their original settings if necessary.
- Do not soil, scratch or remove the caution plate. Should it become illegible or be missing, order another caution plate from the supplier.

- Whenever operating a forklift truck, over crane similar equipment, special care should be taken to
- prevent collisions and damage to surroundings.

1-2 GENERAL SAFETY INSTRUCTIONS

1-2-1 Cautions of operating machine:

- Only well-trained person may operate this machine.
- Always wear helmet, protecting glasses, safety shoes and other protecting equipment as required while operating this machine.
- Do not touch the chip and blade tip of the cutter with naked hands or the moving parts with gloves.
- Do not wear loose clothing or jewelry that can be caught by moving parts of machine.
- During operating, do not take the chip away or touch the rotating portion parts with naked hands and other tools.
- When performing heavy-duty machining, carefully prevent chips from being accumulated since hot chips can catch fire.
- Do not touch any switches with wet fingers.
- Always remember the position of the *emergency stop* button, so that you can press the button immediately if accident occurred.
- Never operate the machine, unless everything is completely set down.
- Do not use fuses other than those are specified.
- Pay attentions to the high voltage devices and keep away from them as possible as you can.
- When the machine is operating, do not put your hands into the rotating and moving objects.
- Stop the machine before adjusting the position of coolant nozzle or disposing the chips.
- Always turn off the power before performing maintenance or inspection.
- Cables, cords or electric wires whose insulation is damaged can produce current leaks and electric shocks. Before using, please check their condition.
- Do not operate switches with gloves. This could cause malfunctions, damage, etc..
- Do not cut the kind of material that are easy to cause fire on this machine, such as magnesium, magnesia ally or other material with lower melting point.
- During automatic operating, never open the machine door occasionally.
- During the time of warming, do not touch or operate the machine parts.

1-2-2 Routine inspections:

- Check pressure gauges for proper reading.

- Check motors and other parts for abnormal noises.
- Check the motor lubrication, sliding parts for evidence of proper lubrication.
- Check safety covers and safety devices for proper operation.
- Before the first time to use, each sliding parts must be freshly lubricated after unpacking or keeping the machine idle for a period. For the lubricant and so on, keep the lubricating oil pump working until oil oozes out from wiper. Contact our service station or agents in connection with what procedure should be taken since it depends on the type of machine.
- Clean the tank so that any abnormalities can be found easily.
- Make sure that the gauges for hydraulic pressure, air pressure, lubricating oil pressure indicated the correct values,
- Make sure that lubricating oil and hydraulic oil are properly supplied to the correct places.
- Oil reservoirs should be filled to indicate levels. Check and fill it up, if necessary.
- Check the coolant level on the tank, and fill it with coolant, if necessary.
- All parts and waste oils should be removed by the operator and places far enough away from the machine set.

1-2-3 Warm up and preparation:

- The power cable from the factory feeder switch to the machine main circuit breaker must check if there is a sufficient sectional area to handle the electric power usage.
- Warm up the machine, especially the spindle and feed shaft by running them for ten to twenty minutes with about half or one-third the maximum speed in the automatic operation mode.
- Wire ropes or slings should be strong enough to handle the loads and should conform to the mandatory provisions.
- Tools should conform to the machine specifications, dimensions and type.
- After installing a tool, make a trial run.

1-3 THE DIAGRAM AND DRAWINGS OF SAFETY

1-3-1 Warning signs and labels:

There are several specific safety signs and labels on your machine. These signs and labels are attached to the machine at easy-to-see locations.

DANGER: Indicated an imminently hazardous situation that, if not avoided, could result in death or serious injury.

WARNING: Indicated a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION: Indicated a potentially hazardous situation that, if not avoided, might result moderate danger to the machine and death or serious injury.

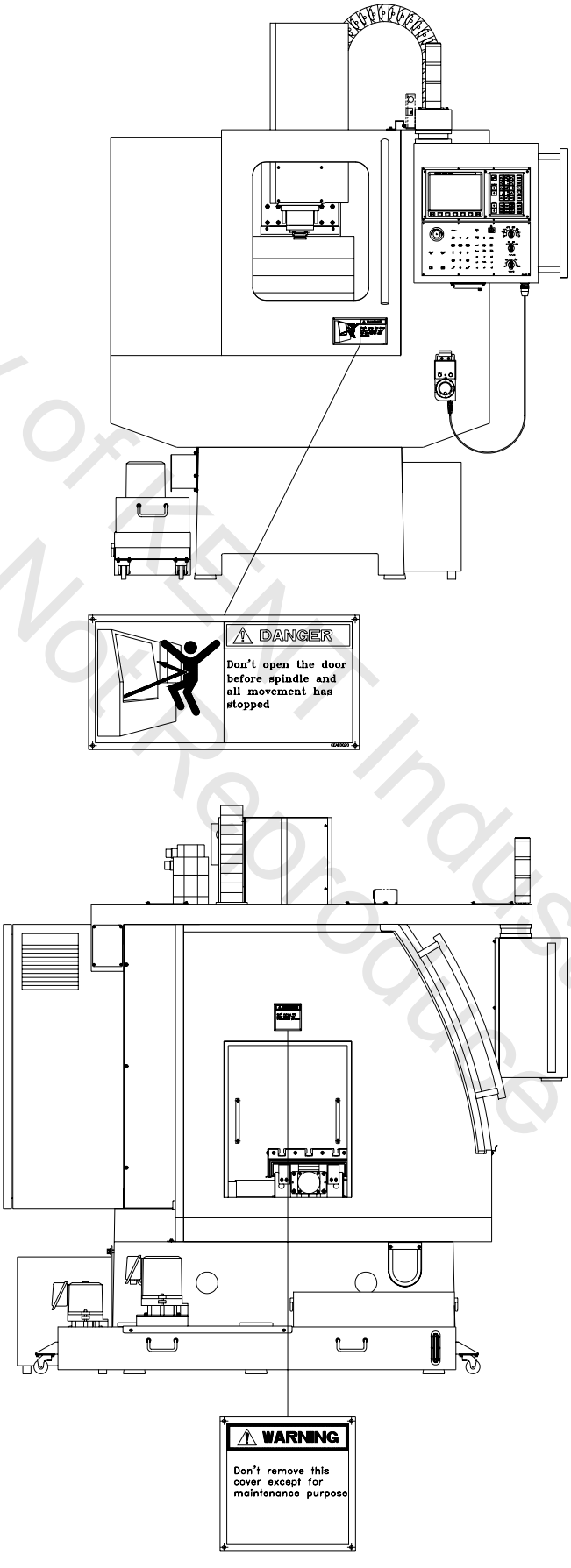
LABELS: Indicated some special purpose or production examined by Q.C. DEP.

Make sure that you can read all warning and instruction labels. Clean or replace these labels if you cannot read clearly. By using a cloth, water and soap clean surface of them. Do not use solvent, gasoline or unknown solution. You must replace new labels if they are broke, missing or cannot be recognized. In addition to the information given on safety labels, there is a variety of other cautionary information, which must be observed by operators during machine installation, operating and maintenance. Read all safety-related information carefully.

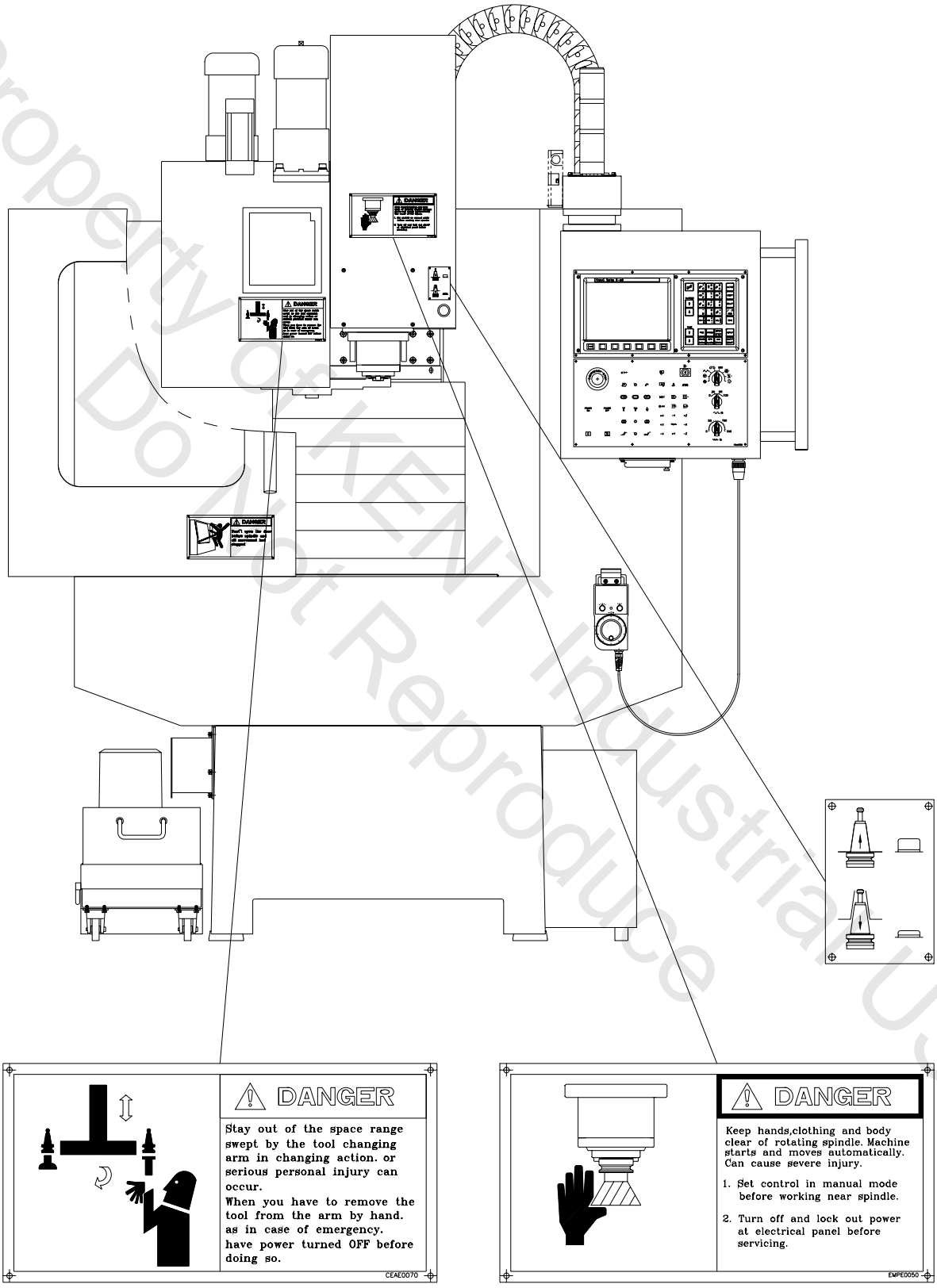
Failure to observe the danger of caution information can lead operators a serious injury or damage to the machine. Always observe this information during machine installations, operation and maintenance.

Those warning and sign labels as shown as following pages

THE WARNING AND LABEL SIGNS

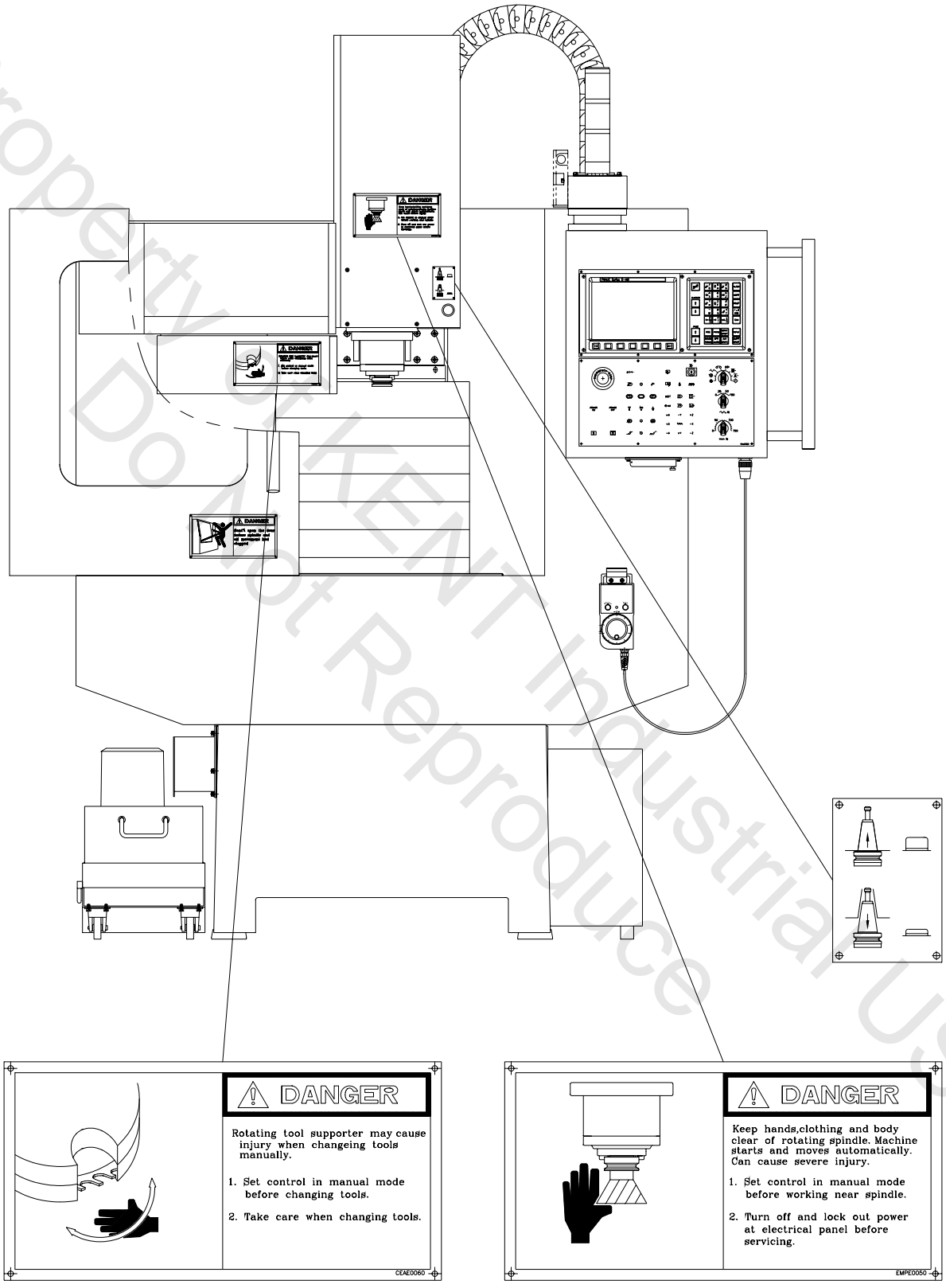


THE WARNING AND LABEL SIGNS



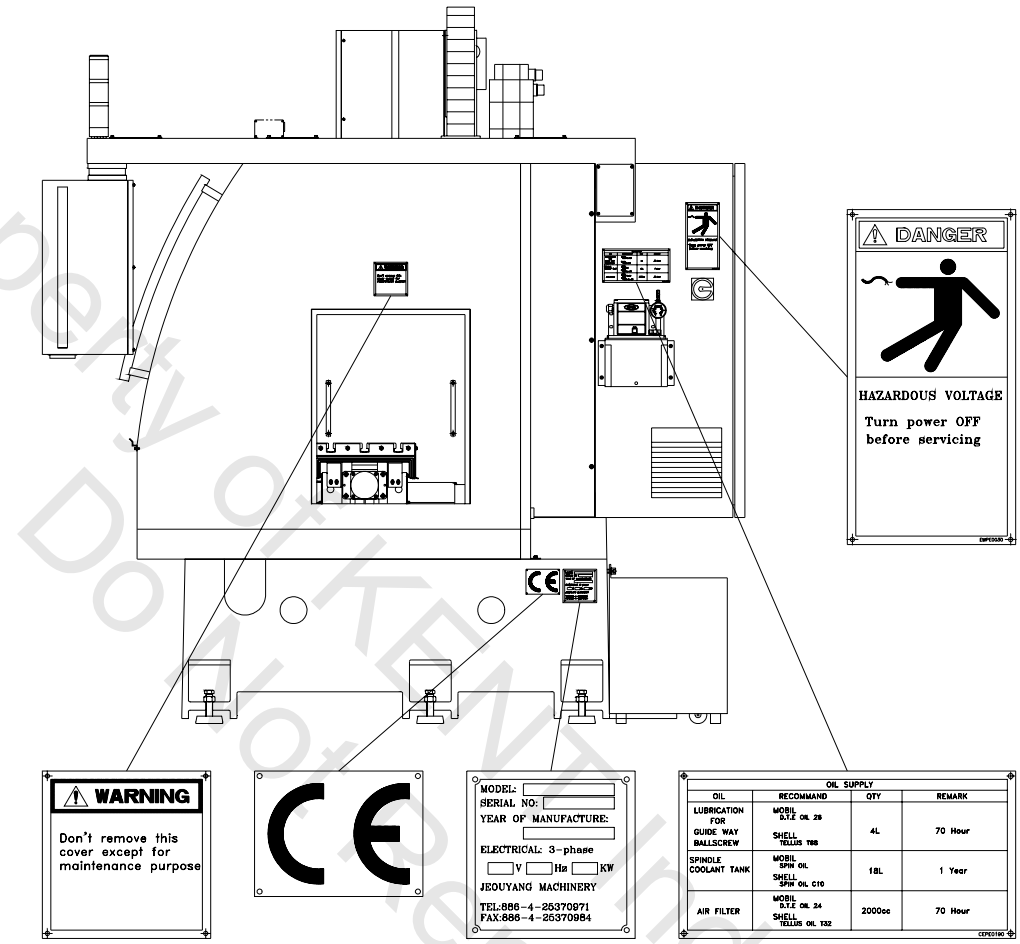
For tool arm type

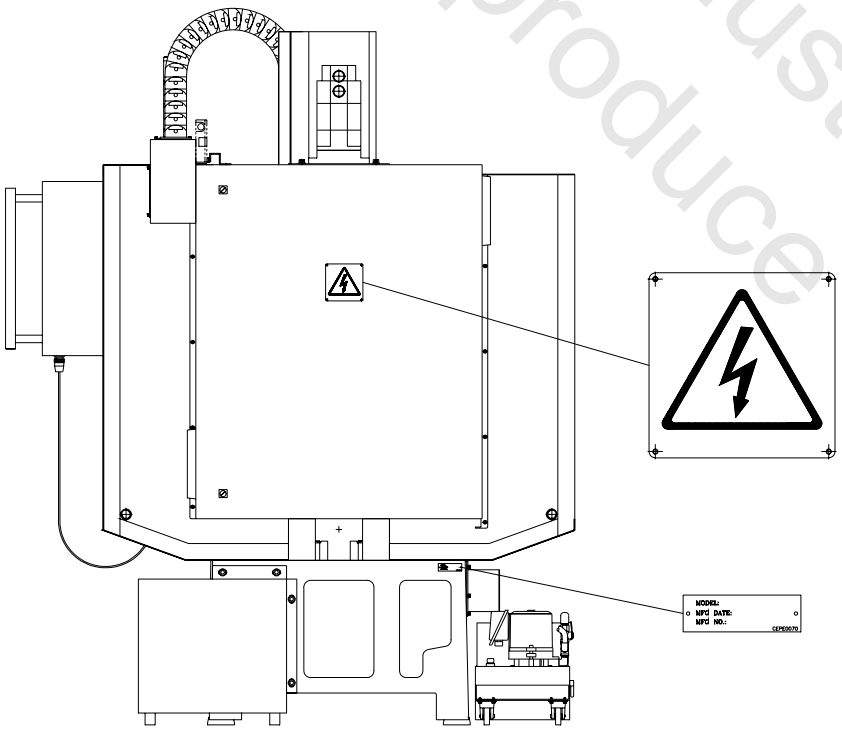
THE WARNING AND LABEL SIGNS



For tool armless type

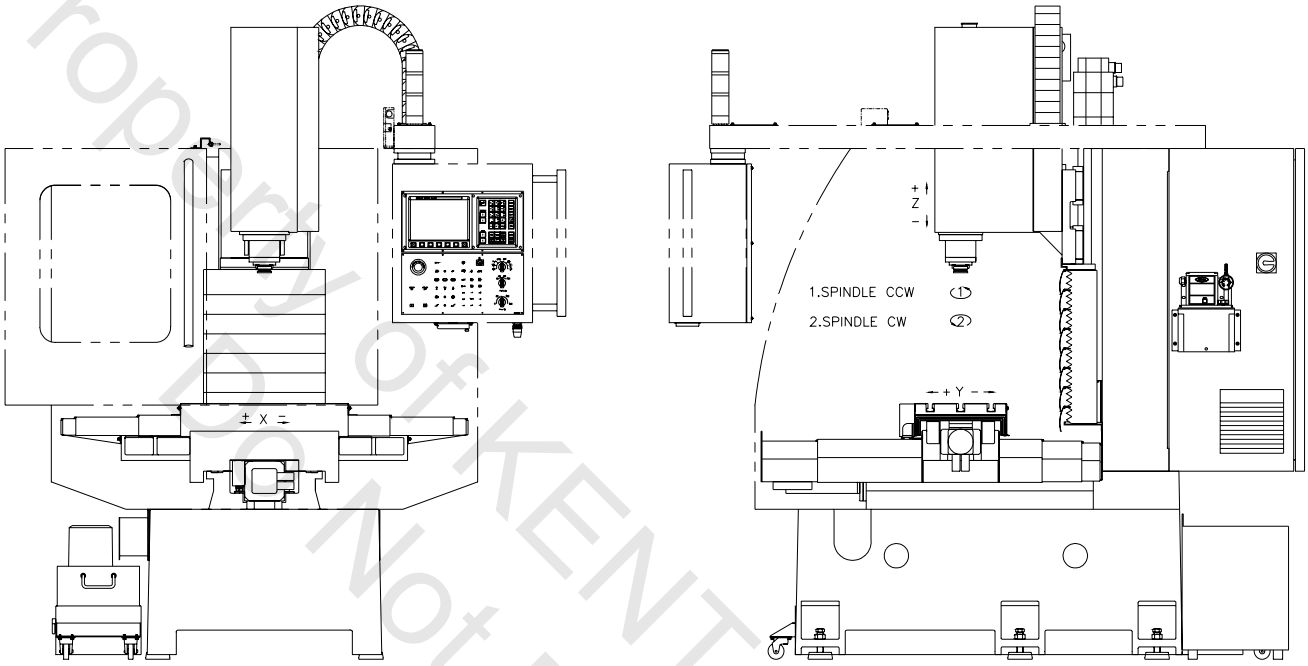
THE WARNING AND LABEL SIGNS





1-4 DANGER AREAS:

1-4-1 Danger zone with moving area:



1-5 SAFETY DEVICES:

Although the machine is equipped with various safety devices to protect operators from injury and machine damage, the operator must comply with the following safety devices without excessive reliance on them. Read the instruction manual thoroughly to completely understand the location each of safety devices and its functions before starting or operating.

1-5-1 Safety devices:

(1) EMERGENCY STOP push button
(2) Tool clamp and release detecting micro switches
(3) Alarm light
(4) Danger, warning, caution labels stick on machine
(5) Float switch for detecting oil volume
(6) Over traverse micro switches and axes stroke end detecting switches
(7) Pressure switch for detecting abnormal pneumatic pressure
(8) Floating switch for detecting abnormal coolant volume
(9) Self-diagnose function (within software)
(10) Full enclosure guard

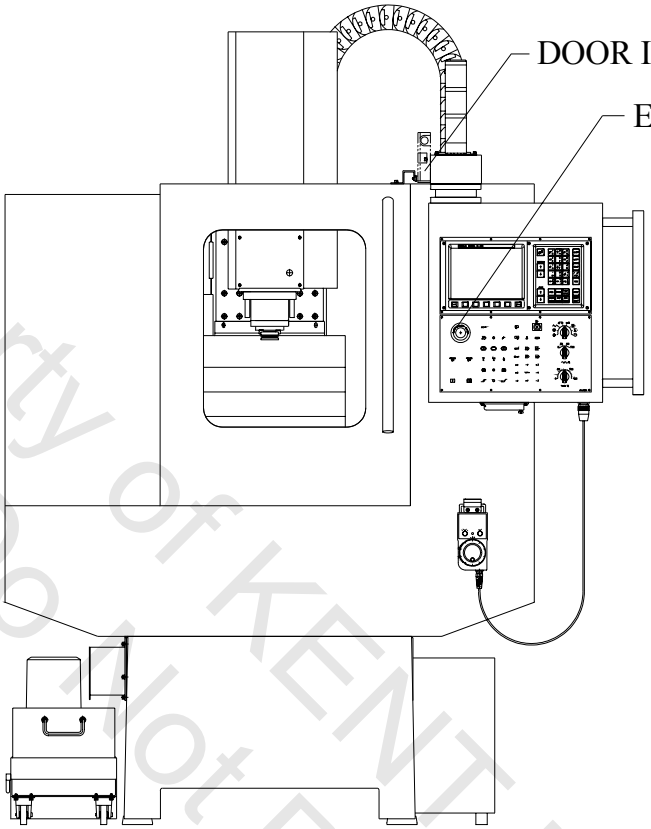
(11) Three axes telescopic covers

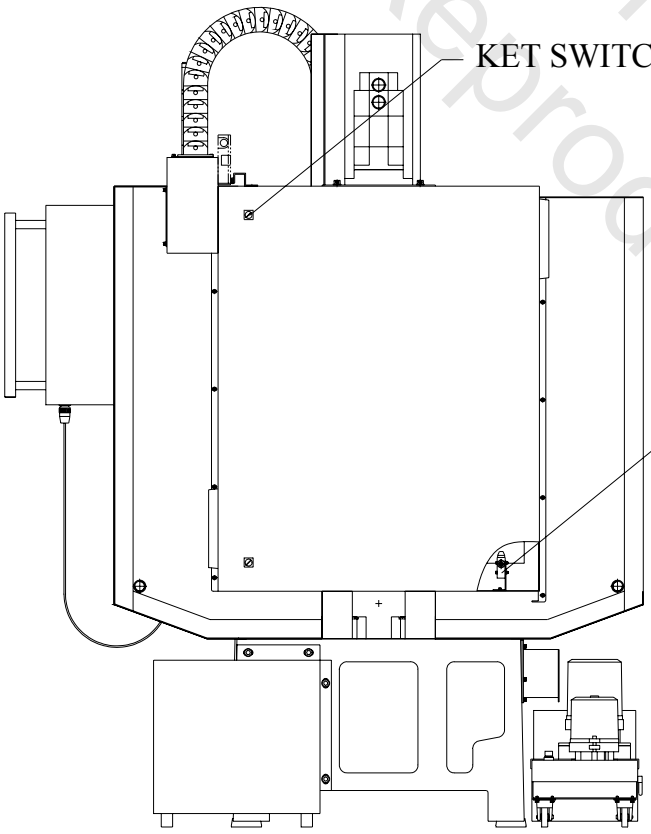
(12) AC motor overload relay (built-in servo motor amp.)

ATC sequence detect micro switches and proximity switches

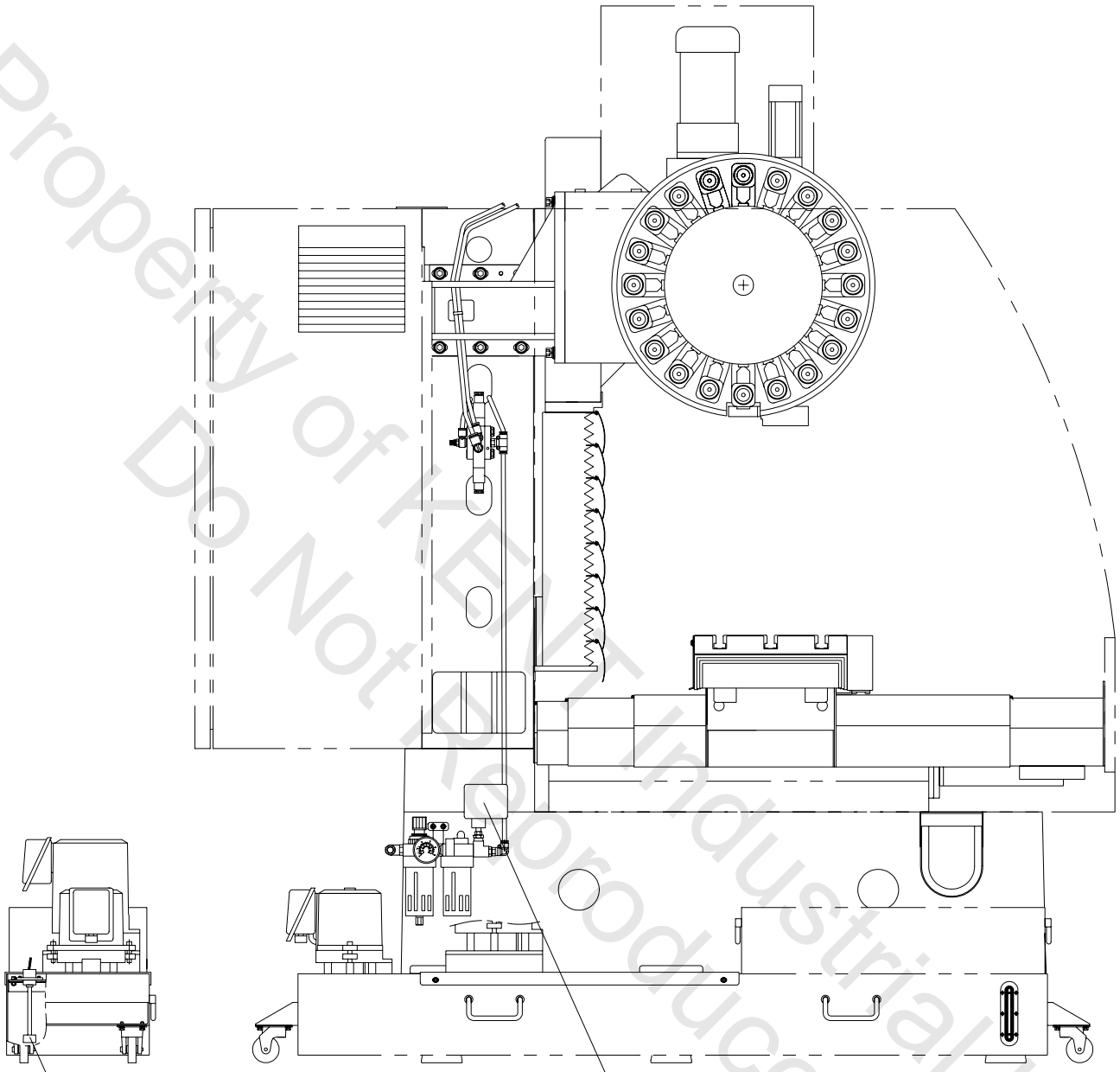
Refer to the following drawings:

THE POSITION OF SWITCHES AND BUTTONS





THE POSITION OF SWITCHES AND BUTTONS

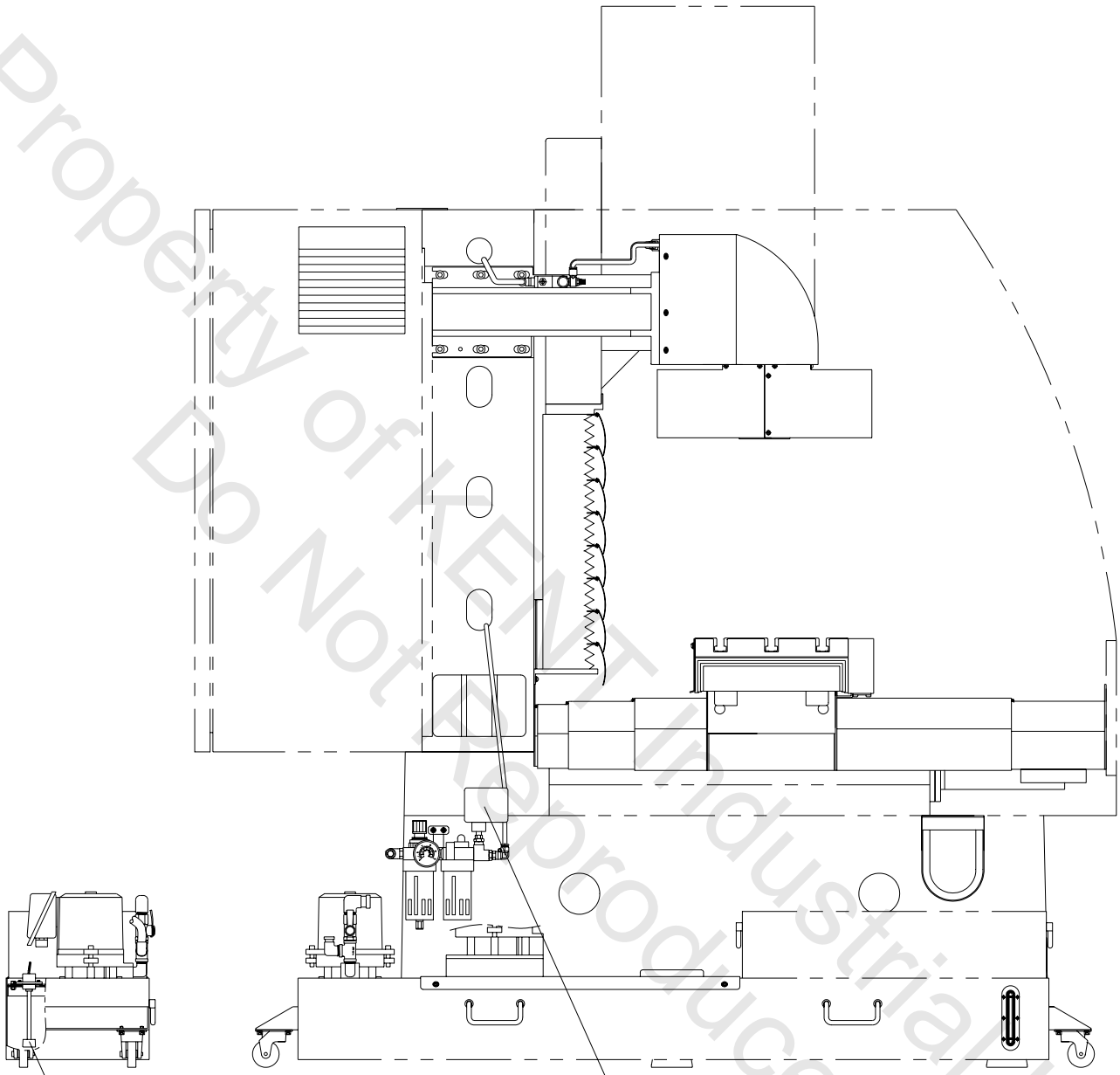


FLOAT SWITCH
COOLANT UNIT

PRESSURE SWITCH
FOR PNEUMATIC UNIT

For tool arm type

SAFETY DEVICES DRAWING



For tool armless type

2 MACHINE VIEWING

2-1 BASIC INTRODUCTION:

- For the safety concern, it is designed with full guarding to protect the people from the moving elements while operation. The door of the guards is interlocked with NC controller to stop the spindle revolution and the axes movement while the door opened in operation mode.
- It is designed that only a skilled person is allowed to operate this machine, otherwise he must be trained until he know how to operate it safely.
- It is designed having automatic mode and handle mode, any settings or adjusting only can be done under handle mode or shut off the power source.
- Well-ribbed base, saddle and column can achieve the maximum rigidity in this class of machine.
- Thermal deformations are minimized for its symmetric structure design.
- Extremely rigid spindle head construction achieves heavy-duty cutting and high precision machining.
- Each set of linear guide ways are finely adjusted to ensure smooth travel and high precision after a long period of machining.
- Specially designed HTD (High Torque Drive) pulleys mean both non-slip transmission and low noise level.
- The ergonomically designed controls are easily accessible to the operator.
- Under normal operating condition and with well maintenance, it will not necessary to renew many components except those are consumable.
- The intended life of this machine is counted by:

  8hrs X 6days X 4weeks X 12months X 10years = 23040 hrs

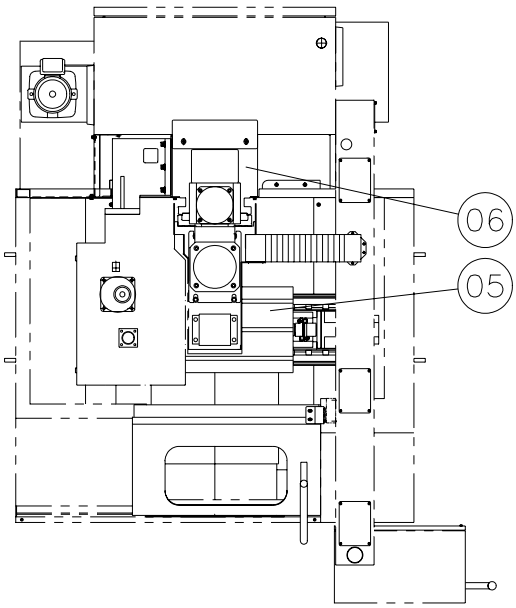
2-2 MACHINE COMPONENT:

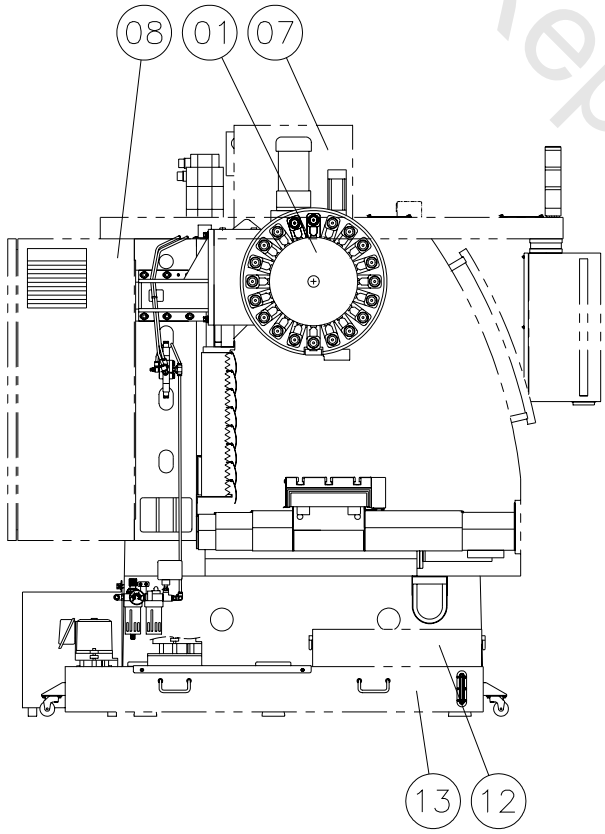
The V-SERIES machines basically consists of base, column, saddle, table, tool changer arm, preset box of A.T.C., tool magazine, transmission system of tool magazine and three axes, operation cabinet, headstock with spindle, chip tank, coolant tank, electric controlling cabinet unit, pneumatic system, lubrication system etc...

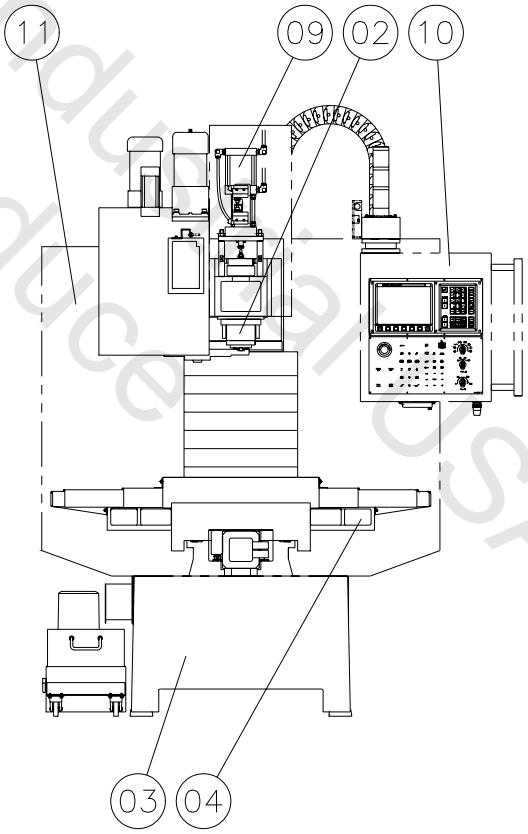
2-3 MACHINE OUTLINE:

2-3-1 Nomenclature:

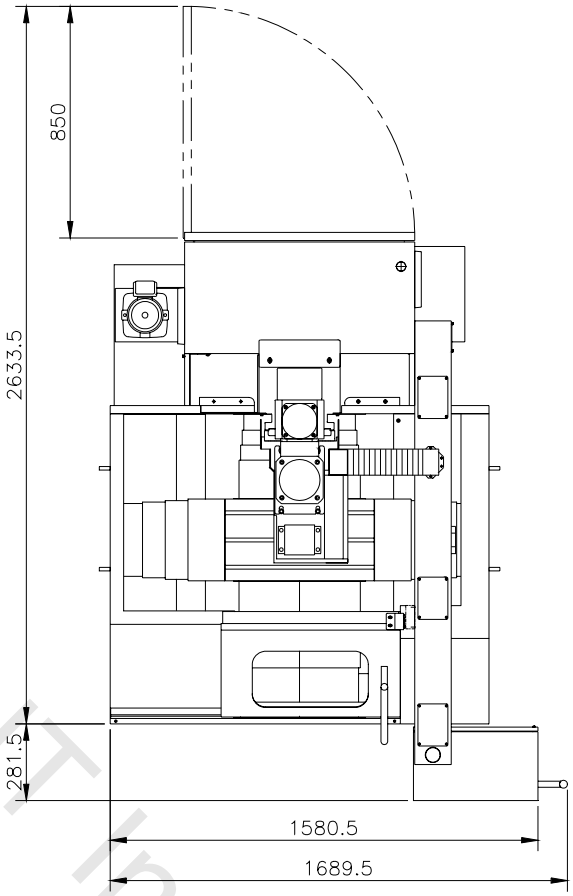
	DESCRIPTION
1	AUTOMATIC TOOL CHANGER SYSTEM
2	SPINDLE ASSEMBLY
3	BASE
4	SADDLE
5	TABLE
6	COLUMN
7	SPINDLE HEADSTOCK
8	ELECTRICAL CONTROLLING CABINET
9	TOOL CLAMP/UNCLAMP UNIT
10	OPERATION CABINET
11	SHEET METAL ENCLOSURE GUARD
12	CHIP PAN
13	COOLANT TANK

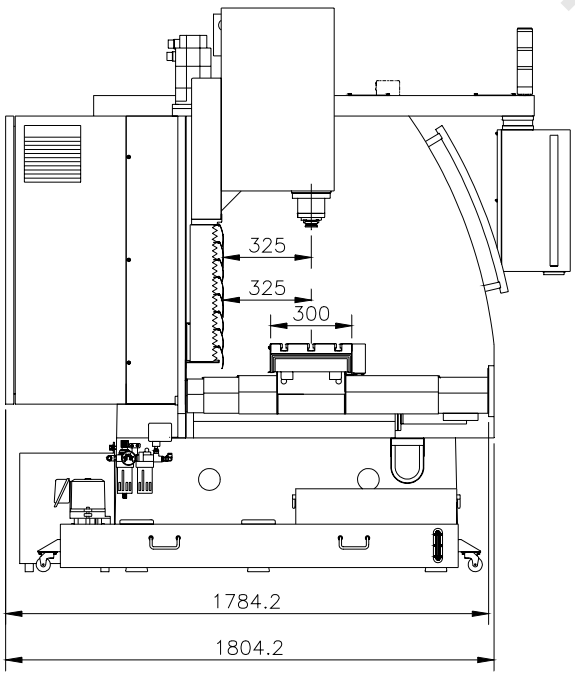


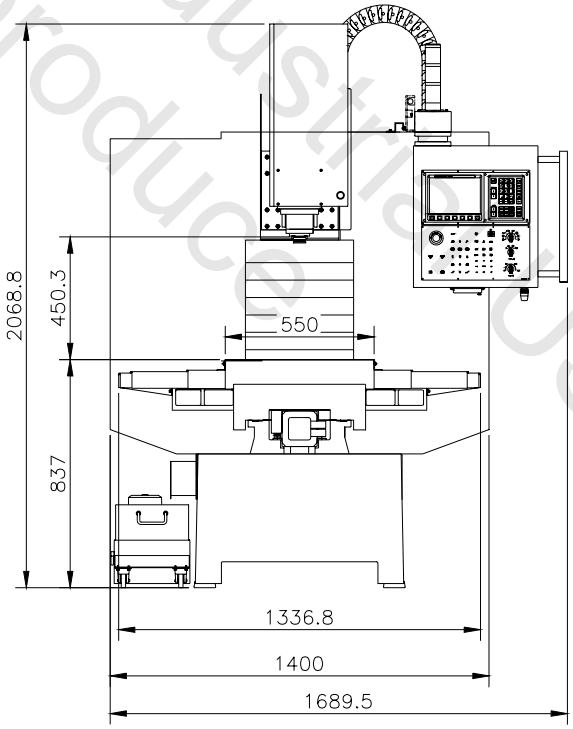




2-3-2 Machine viewing and major dimensions:

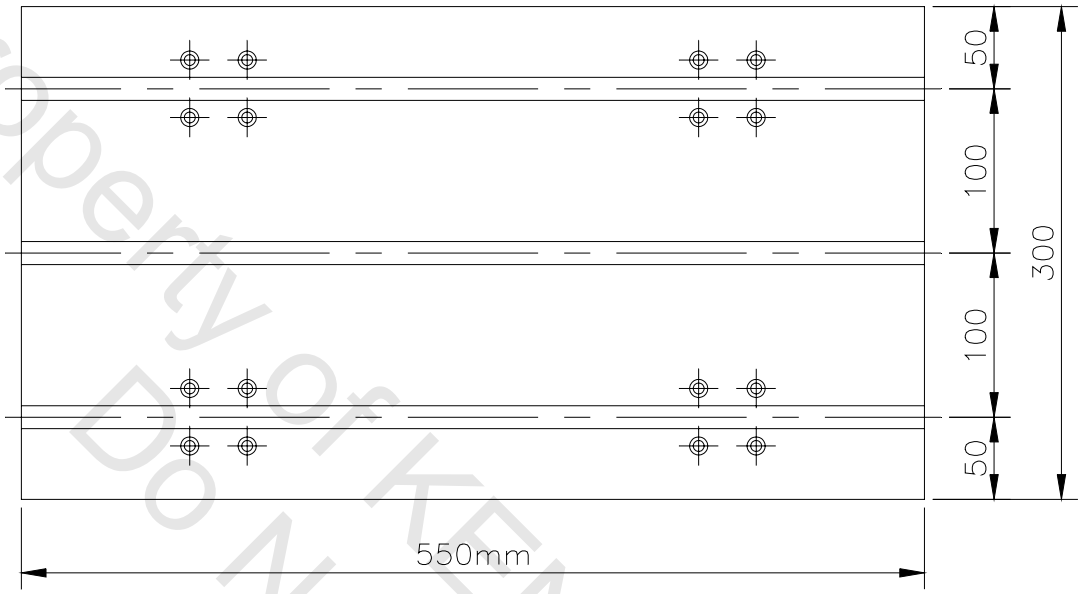


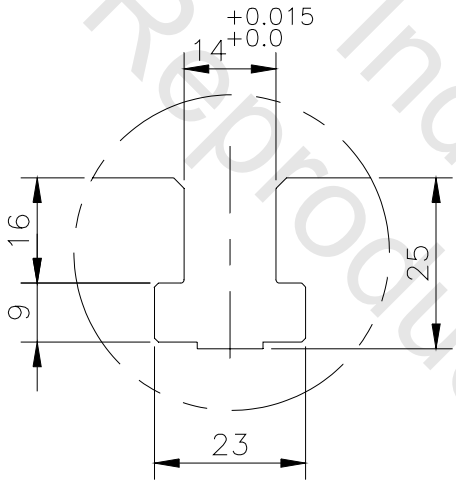




2-4 TABLE SPECIFICATIONS:

STANDARD TABLE





T-SOLT DIAGRAM

JM450 Series

3 PREPARATION

3-1 ENVIRONMENTAL REQUIREMENT:

(1) Where the machine tool avoid exposing to the direct sunlight and/or near to a heat source, etc.. Ambient temperature during operation: 0 thru 40 ºC (32 ºF to 104 ºF).

(2) Avoid a location where the humidity is considerable fluctuating and/or it is highly humid; normally within 30% to 75% in relative humidity.

(3) Avoid using the machine tool under such environment as to be especially dustful an/or to have a vaporous organic corrosive gas highly concentrated.

(4) Where there is no vibration source in the surroundings.

(5) Flat and smooth ground without dust or other particles. The required bearing pressure of the floor is at least 5000 kg/m^2.

(6) The machine must be protected from electrical noise sources, such as electric welders and an electric discharge machines.

(7) Always ground machines independently, the ground resistance is 100 ohms or less and the length of ground cable is as short as possible.

(8) The sound pressure level at the operator's position is under 80dbA. (According to JIS B6004, 1980; Method of sound measurement for machine tools.) It is the policy of the company to remedy the machine if the sound is over 80 dbA while running test.

(9) Foundation should be constructed of either reinforced or non-reinforced concrete with thickness and consistency compatible to industry standards for machine weight.

(10) Protect the machine from exposing to the source of electromagnetic interfering or radiated emission. All signal cables and wire have been connected to ground and protected by cabinet or isolate conduit.

3-2 POWER SUPPLY：

The current standard voltage in the Republic of China is AC 220V of power system. It is recommended that the electrical equipment or a machine only has one power supply connection. When other voltages are required within the machine, then these should be supplied by equipment, which is part of machine such as transformer, motor generator.

3-2-1 Power requirements:

General voltage supply: ±10%

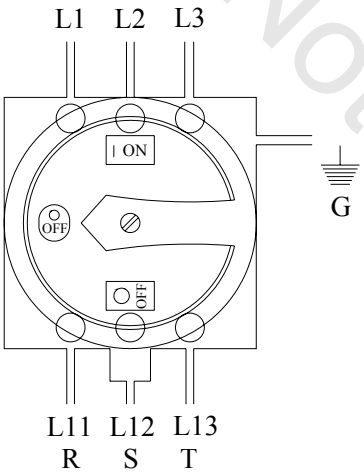
Frequency deviations: ±2%

Voltage loss: up to 10ms

Voltage peaks: up to 200% of the rate r.m.s. Supply voltage

3-2-2 Wiring:

The connecting cable to main power source specified as following table:



POWER	WIRE	LENGTH
10KVA	φ 5.5 FOR AC220V	5M
	φ 5.5 FOR AC380V	5M

3-2-3 Power capacity

DESCRIPTION	SPECIFICATION
Power Required	10 kva
Frequency	50/60 Hz ±1%
Spindle Motor Power(30 min)	3.5/5.5 kw
X/Y/Z Axes Servo Motor Power	0.6 kw/0.6kw/1.0kw
NC Switch power	1 kw
Lubrication Pump Power	65 w
Coolant Pump Power	650 w (220V)

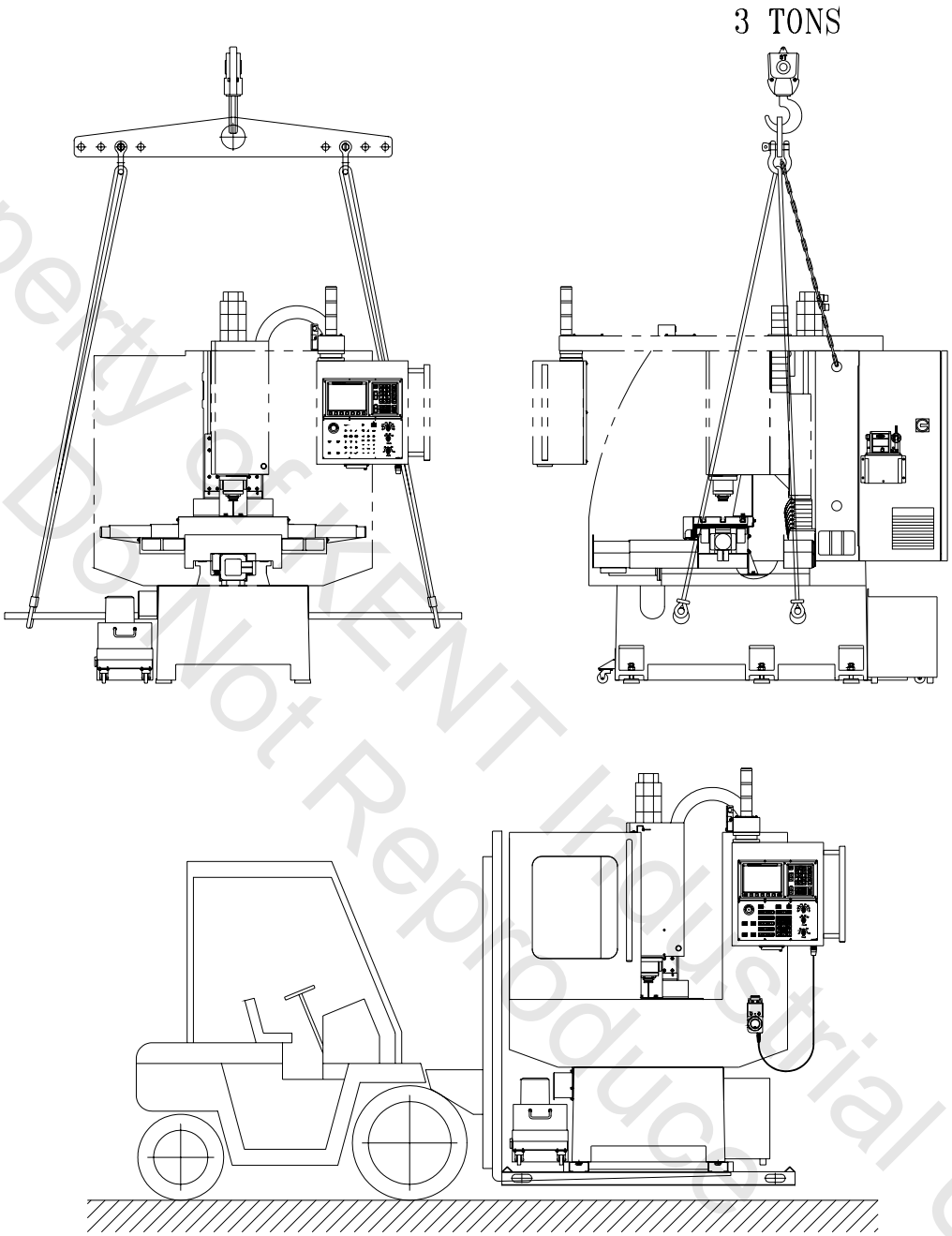
Tool Changer Motor Power	410 w (220V)

3-3 INSTALLATION REQUIRMENT:

3-3-1 Precaution:

1. Only trained, qualified workers should operate forklift trucks, cranes or similar equipment and apply slings.
2. Only an authorized technician should perform work with the machine hoisting.
3. Use only wires of dimensions specified in the manual.
4. Before hoisting the machine, make sure that each of the units is fixed securely.

3-3-2 Transportation:

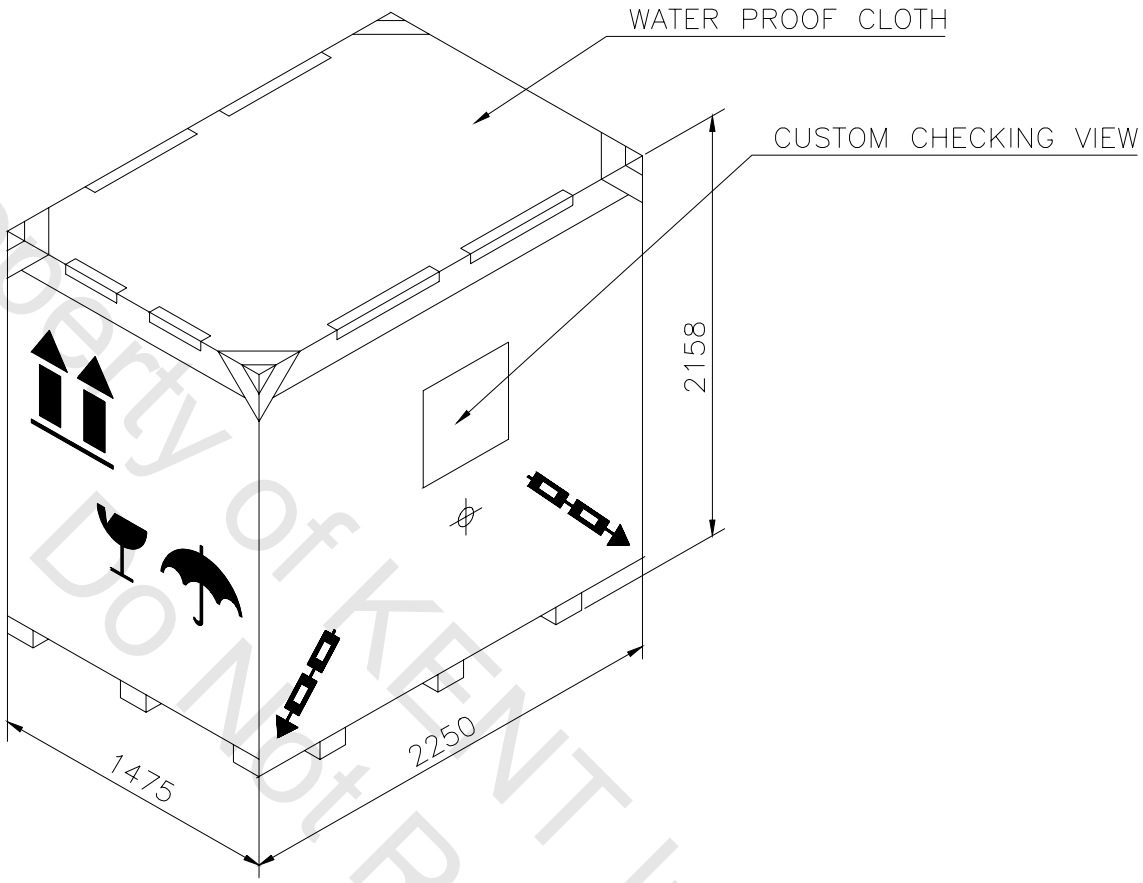


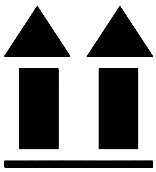
4 TRANSPORTATION AND INSTALLATION

4-1 REMOVE THE PACKED MACHINE

4-1-1 Remove the wooden package:

Before transport or install machine properly refer to the following remarked on the wooden cage.

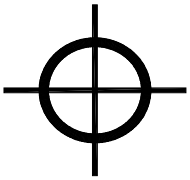




This side up

Be careful fragile inside

Sling here



Center of balance

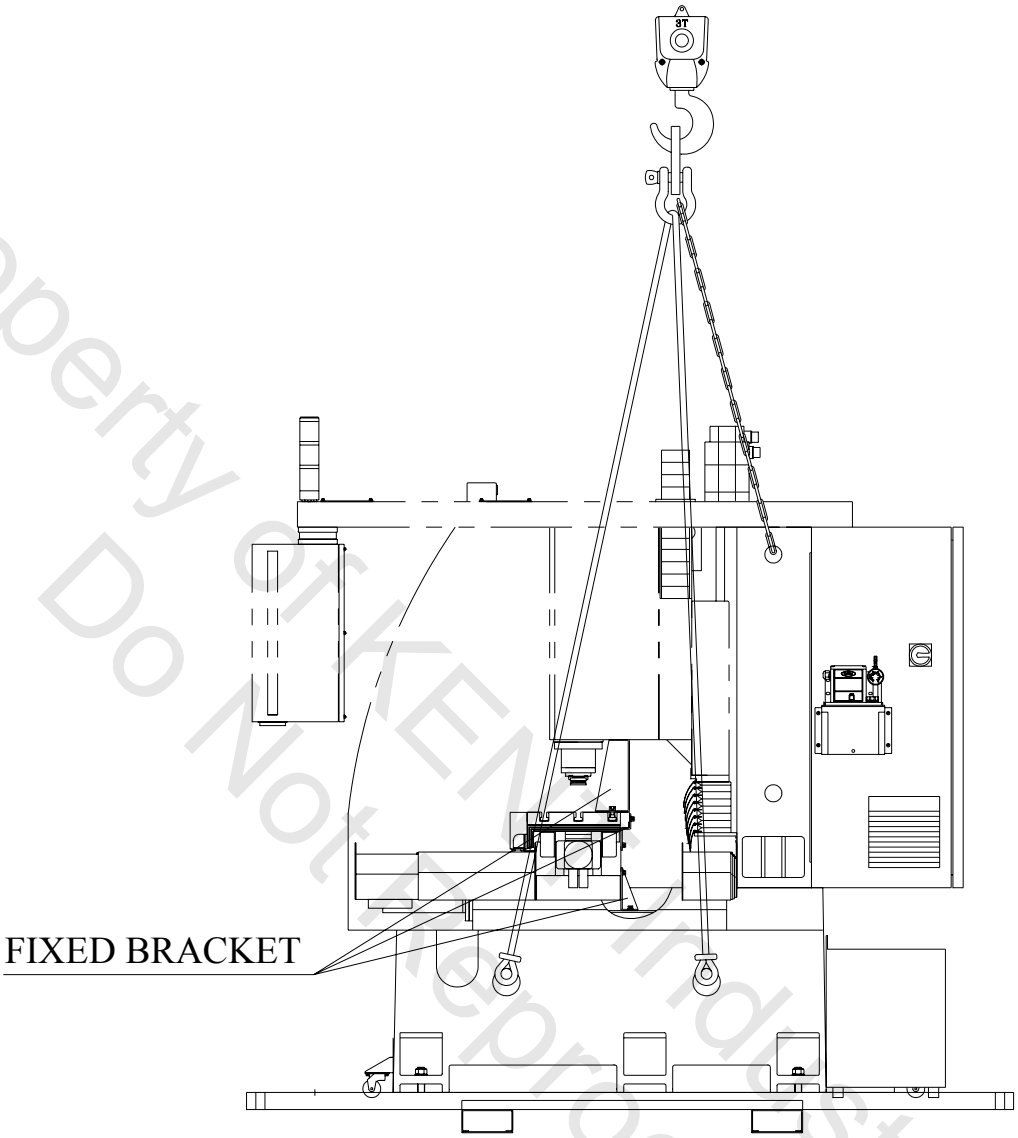
4-2 UNLOAD AND INSTALLATION

4-2-1 Precaution

1. Always the authorized personnel can remove the wooden cage.
2. Be careful during remove the wooden cage or vacuum package, and keep away from damage onto the machine inside.
3. Keep clean around the machine and floor, especially pay attention to the mails and other particles before unload.
4. Check the rope used to lift the machine, if it is both strong enough and in good condition for the weight of machine.
5. Ensure that there is a little clearance between the back panels of machine forklift apron.
6. Be sure electrical cables and wiring will not be damaged during the lifting of the machine from the skid.
7. Be sure electrical cables and wriing will not be damaged during the lifting of the machine from the skid.

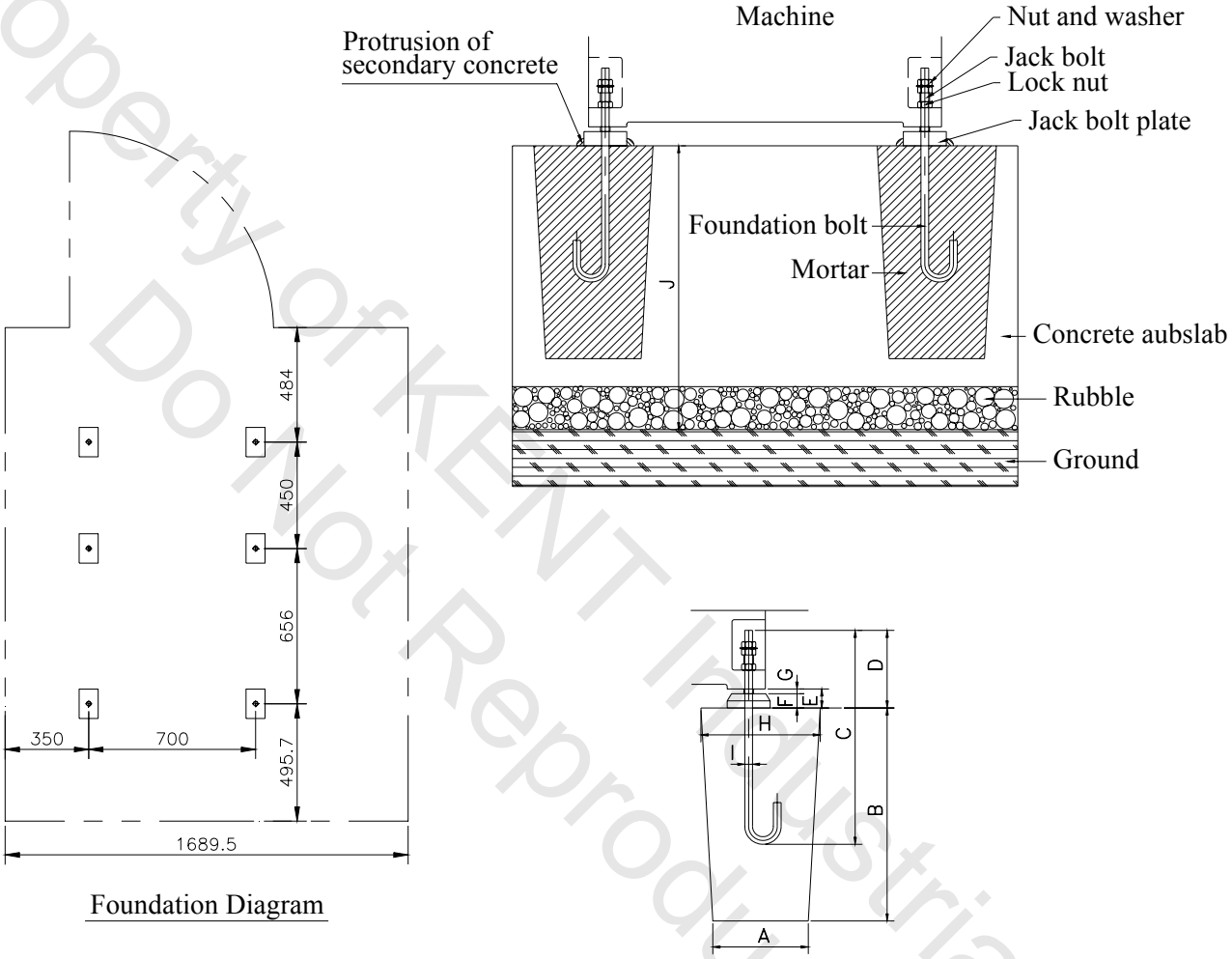
4-2-2 The procedure of unloading and installation:

1. Take of the plate around the wooden cage and volatile corrosion in hi biting film, until the machine lift on the shipping pallet.
2. Remove the other accessories on the machine such as chip tank, chip guard, etc. Then take off the packing bag.
3. Release the bolts and nuts fixed on the wooden skid.
4. Make sure that the wooden block for supporting is fixed securely.
   (Refer to the following sketch)
5. Install the machine to the proper site by using forklift or crane.
6. Whenever move machine in future, it's necessary to use those fixed block for supporting the machine parts.
7. After removing, keep those fixed blocks for next time using.



4-3 POSITION AND PREPARATION:

1. After setting down the machine and accessories ports on adequate site, put the foundation pads under the foundation bolts. Then position the machine. (Refer to the foundation drawing)



Foundation Diagram

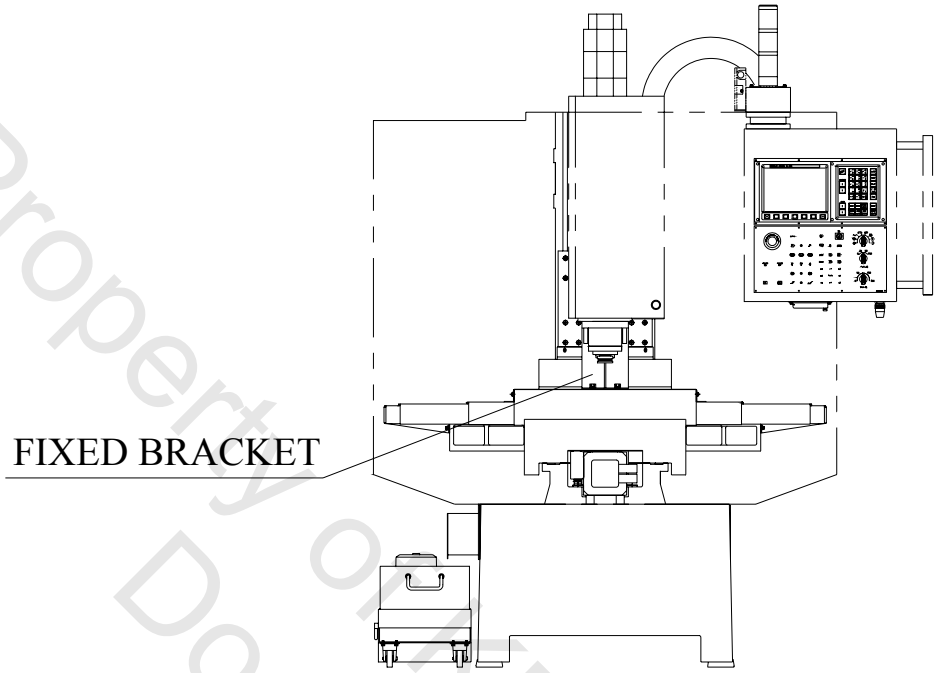
Unit	A	B	C	D	E	F	G	H	I	J
Mm	200	450	460	170	45	35	10	250	10	700
inch	7.9	17.7	18.4	6.8	1.8	1.4	0.4	9.8	0.39	27.5

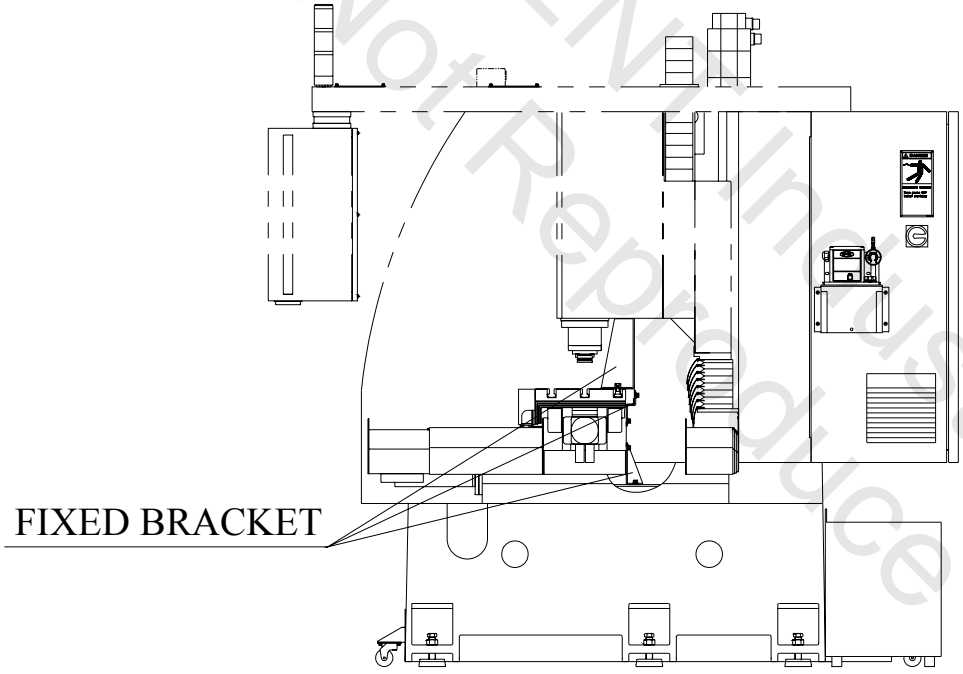
2. All the bare parts of the machine, which have been coated with a rust inhibitor for transport, must be carefully cleaned by rags with paraffin or fuel oil and wrung out. Toluene compounds must not be used.
3. After installation and cleaning, connect the wire to the power source and ensure the requirement of power capacity is proper.
4. Power on the main power and switch on the machine then check if it is any unusual

things occurred.

4-4 REMOVES THE FIXED BRACKETS:

1. Remove the dryer and the brackets fixed on both left door and right door handle.
2. Unless power on, do not move away the support block of spindle headstock. It is the last step to move.
3. Loose the screws of the fixed brackets between saddle and base. (Refer to the sketch)
4. Except authorized personnel, do not remove the shipping support from beneath the machine as you like anytime. Our service engineer will do with the job, if you need.





4-5 POWER ON:

1. Make sure the main power supplier switch is turned off before the power cable connected to the power source.
2. Connect the wire of hydraulic system and ship conveyor with the socket on the left side of electric controlling cabinet.

3. Connect the main cable of machine with the terminal in power source box of factory.
4. Check if the voltage capacity is matched with the power source and machine system requirement.
5. Check if the phrases of motors and pump are correct or by phrase-meter.
6. After everything settle down, power on and turn on the main switches of machine, which are on the top of power cabinet door and the side of operation panel. Then check there is any abnormal signal or alarm appeared on the CRT or operation panel.
7. By using MPG, let the spindle headstock upward and take the support black away.
8. Let the spindle headstock downward a little and ensure the upward wind is from the cool fan of spindle motor.
9. If there is no deployment on the screen after power on, please refer to the parameter tables of electric manual to input them and restart again.
10. So far, everything is all right and the well-trained, authorized operator could operate the machine.

4-6 LEVELING:

1. After the processes of installation, the machine level may undergo minor changes with theelapse of time. Make it a point to check the level periodically.

2. Move the table and saddle to the center position of machine by programming or manual operation.

3. Place the levels on the table to adjust the foundation bolts and nuts by the bubbles of level gauges which are located in the center of levels, that is, machine reach the static level.

4. Then tighten those bolts and nuts.

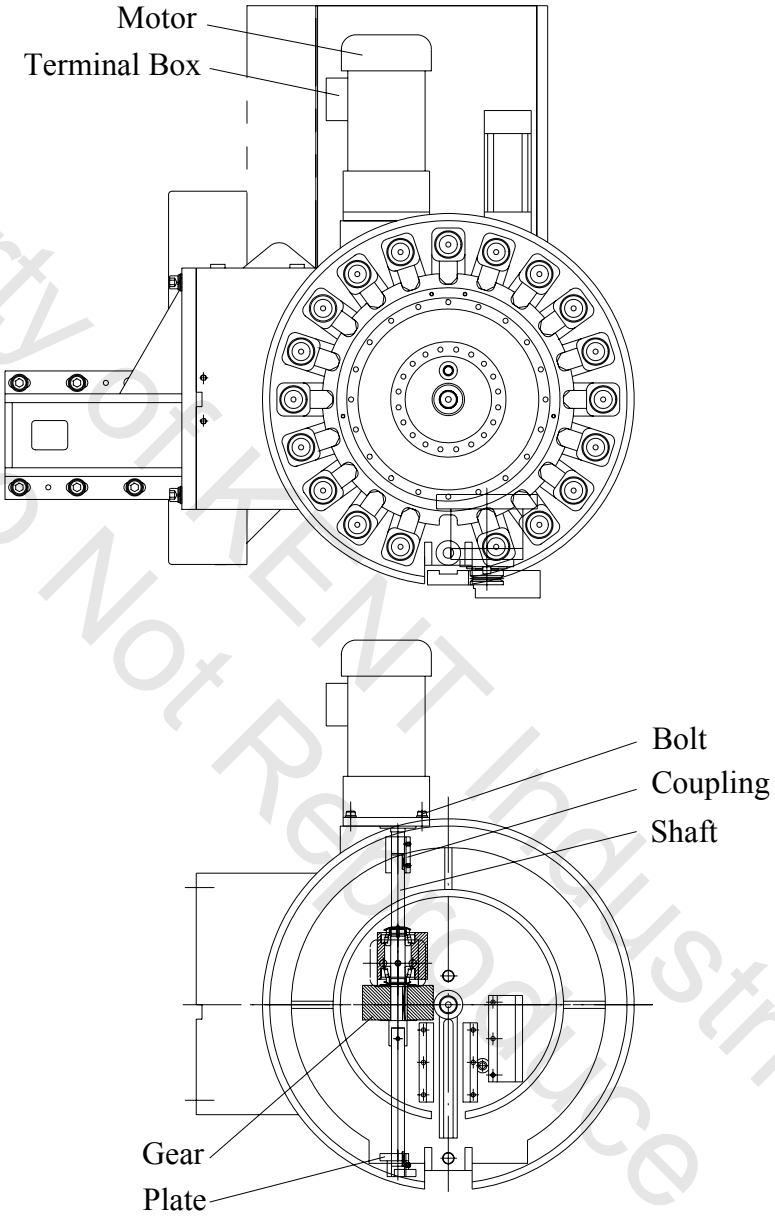
5. After static level, move the table along Y-axis direction with three points during the moving of full travel. The bubbles of levels should be indicated the movement within one grid of levels and adjust bolts and nuts.

6. Tighten the foundation nuts after leveling along the Y direction.

7. Follow the same steps as step 5 and step 6 but along X-axis direction to measure the

dynamic level of X axis and the movement must be in half grid of the levels' bubbles.

8. Tighten all of the foundation bolts and nuts to level dynamically.



4-7 THE STEPS OF REPLACE MOTOR ON TOOL MAGAZINE BRACKET (OPTION):

1. Take the motor with coupling shaft (long collar) and let the terminal box face to left side

of machine. The direction is shown on the following drawing marked no. 1.

2. The keyway on the end of coupling shaft linked motor faces to the key locked on the cam shaft as drawing marked no. 2. Ensure the keyway match with key, the authorized technician can turn the coupling shaft a little bit for checking.
3. Tighten the for screws on the motor plate as shown on drawing no. 3, then connect the wire (remarked U, V, W) to terminal box. Power on and make sure the phase of motor is normal condition. If here is any abnormal operation, feel free and contact with our service person or LW local agents or dealer.

5 REPARATION BEFORE OPERATION

5-1 INSPECTION BEFORE OPERATION

1. Make sure the power cabinet is well closed.
2. Make sure the lubrication oil is full in pipe.
3. Check the coolant tank is already filled with suitable liquid.
4. Check if all of pipes are fitted tight and no loosen.
5. Ensure the doors of safety guard are closed.
6. Make sure all power force fit on requirement and sufficient performance.
7. Make sure the emergency stop button is at release condition.
8. Make sure all buttons have normal functions. (Every buttons' function describe on detail in the next chapter)
9. Make sure that there is no alarm message before operating.

5-2 FEATURE OF KEY PARTS

5-2-1 Pneumatic systems:

1. PRECAUTION：

a It is most important that only properly instructed and qualified personnel use this equipment.

b This equipment should only be used within the limits detailed in the technical specification. Strict observance of the technical specification should be ensured at all times.

c Correctly prepared compressed air should be used at all times. When installing the equipment and thereafter, the customer shall ensure that the environmental conditions at the place of use are taken into consideration.

d he equipment is incorporated in a system or used within safety devices or circuits, the customer shall ensure that national and local safety laws and regulations are observed.

2. PARTS AND COMPONENTS:.

3. TECHNICAL DATA AND OUTLINE DIMENSION:

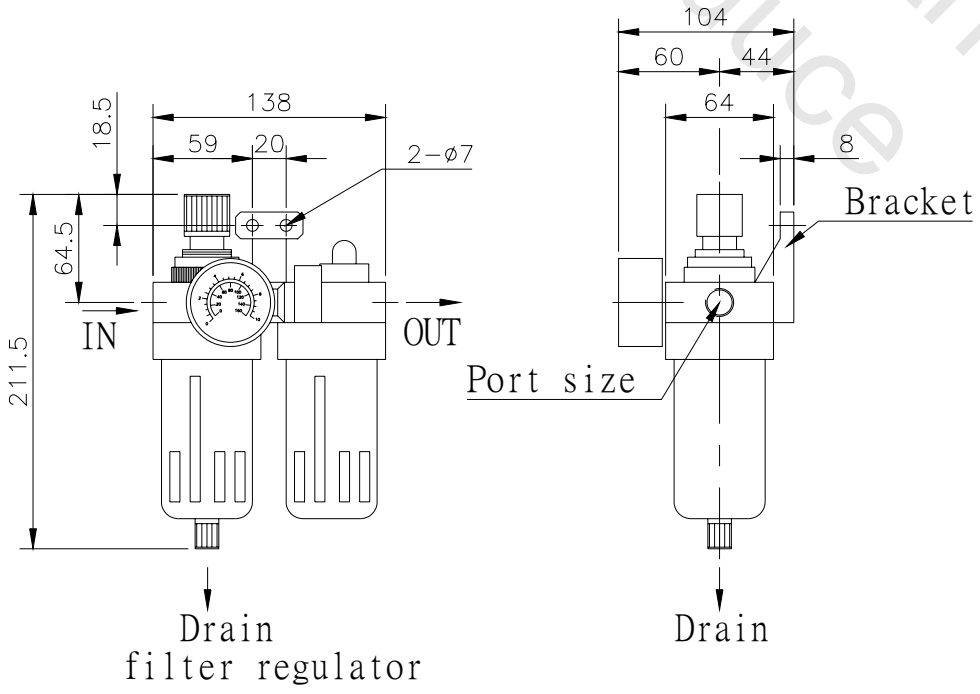
a TECHNICAL DATA:

TYPE	AC3010 BACK AIR CONTROL UNIT
Max. Operating pressure	9.9 kgf/cm^2
Min. operating pressure	1 kgf/cm^2
Regulating range	0.5 ~ 8.5 °C
Ambient and media temperature	5 ~ 60 °C
Pressure gauge indicated	10 kgf/cm^2
Filter rating	5 μ m
Filter bowl capacity	20 cm^3
Max. Flow rate	1700 1/min
Lubricator bowl capacity	50 cm^3
Recommended oil	ISO VG 32 (20 °C)
Range of lubricator function	5 drops/min, P_{IN}=5 kgf/cm^2, 401/min

NOTE :

1. Polycarbonate bowls may be damaged and possibly fail if exposed to synthetic oils, thinner solvents, trichlorethylene, kerosene or other aromatic hydrocarbons. When used in above atmosphere, please use a metal bowl.
2. Unsuitable for flow is below 100 normal 1/min.
3. The drain line should be 8 mm or more and overall line should be less than 5 M.

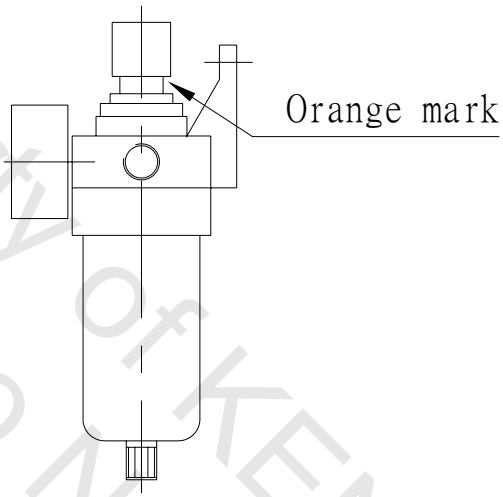
b OUTLINE DIMENSION:



4. THE SETTING METHOD OF FRL UNIT:

a Check pressure supply before adjusting system pressure.

b The adjustment knob is a locking type. Pull the knob upward from the body until an orange band is visible. (Show on the drawing)

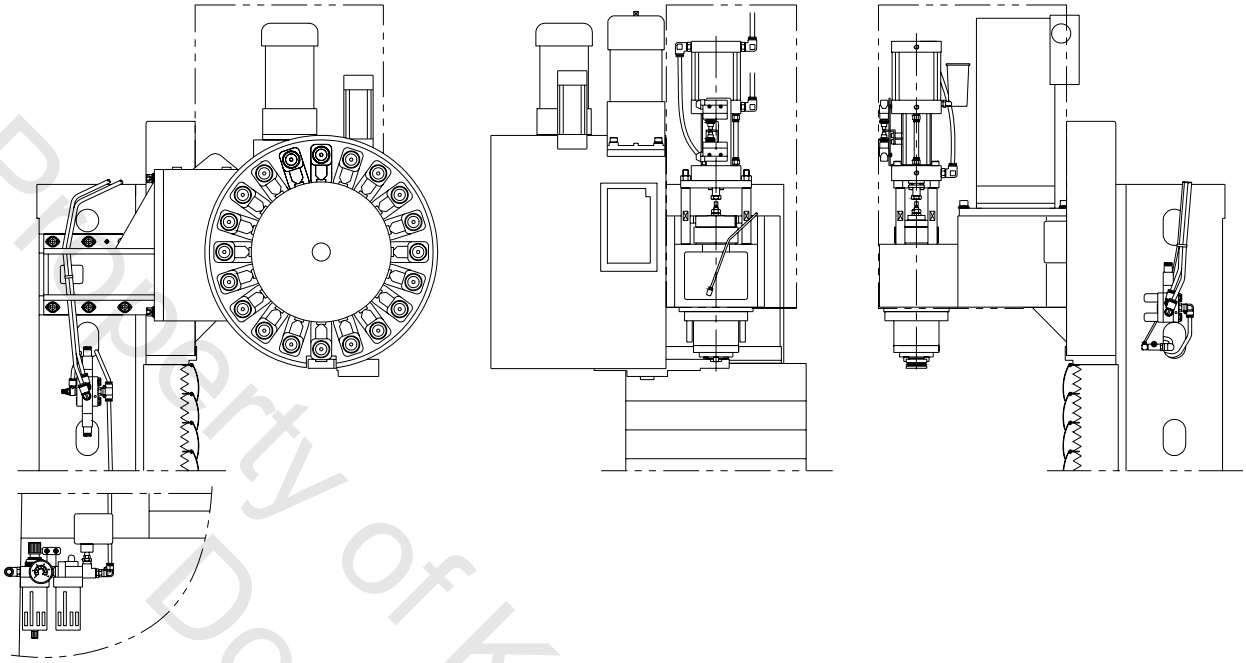


c Adjust as necessary, that with watch of the pressure gauge and clockwise rotation of the knob results in an increasing pressure or counterclockwise turn will reduce the pressure.

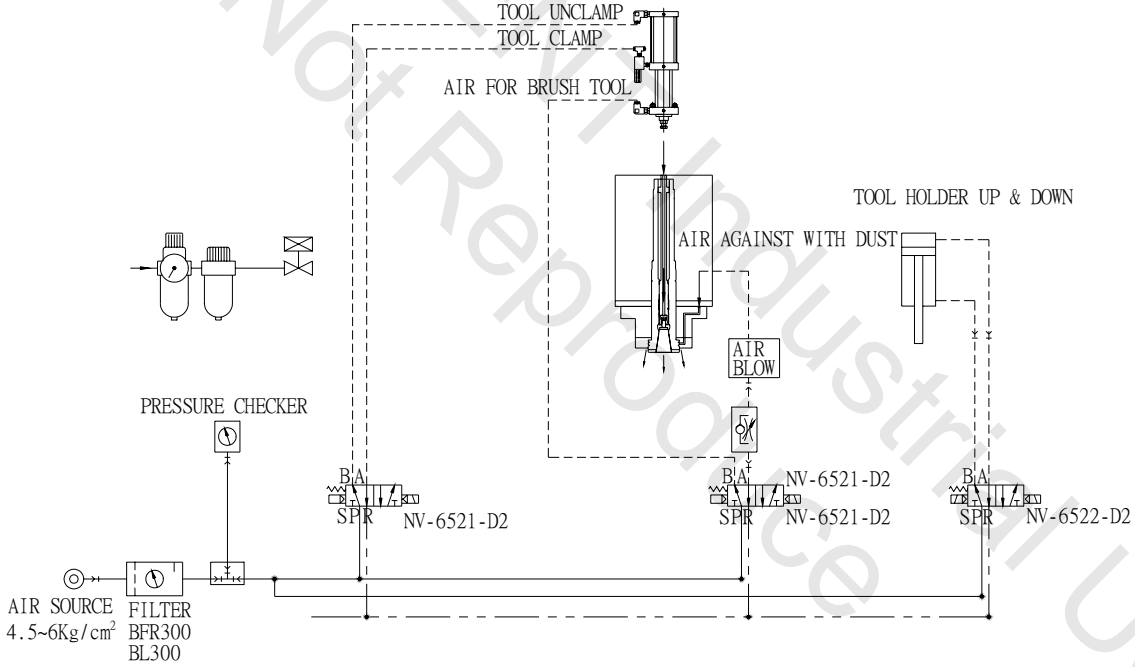
d Then push the knob back into locking position after adjusting.

e Adjust oil droplet by turning a knob of needle valve, clockwise turn will increase oil capacity and counterclockwise turn (fully open) will stop the oil droplet.

5. THE ROUTE SKETCH OF PNEUMATIC SYSTEM



THE LOOP DRAWING OF PNEUMATIC SYSTEM



For tool arm type

5-2-2 Fill up lubrication oil:

a After opening the cap of oil inlet, fill up the clean fresh oil till to the top line of high level.

b The oil tank should always preserve clean lubricant.

c In case of impurity remains in the oil tank, please take the oil away and wash the tank, oil net immediately. Then refill up new oil or it will fail the oil feeding.

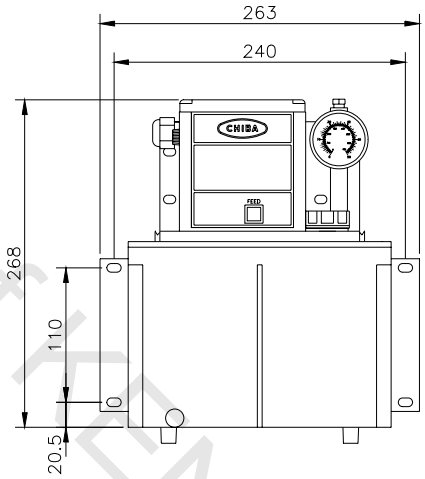
d The lubricator act by NC Controller. Action time 10 second and stop 60 second.

e The operator pressure to the machine is 10 ~ 15 kgf/cm^2.

f It is necessary to refill up lubricant oil if oil level is below the lower line during operating.

NOTE:

1. The oil quantity will reduce gradually under normal application.
2. Be careful whether the motor is running normally or abnormally, if not, contact to the local agent or JEOU YANG service department.



● OPERATION INSTRUCTIONS：

1. Please note this timer voltage specifications and refer to the electrical connections illustrations, (see Distributor map in cover).
2. Initially, open the oil outlet up to exhaust air inside the filter, after the empty oil up to the position connect with the pipe, it begins.
3. The method of setting time outside machine, it connected with PLC if it need continuous lubricating please push reset button.
4. The pressure is adjusted by pressure regulating vale which is like a ring spanner, Clockwise Turing, the higher the pressure is, Counter-clockwise Turning, the lower the pressure is which can be shown from pressure gauge.

● NOTICE ITEMS：

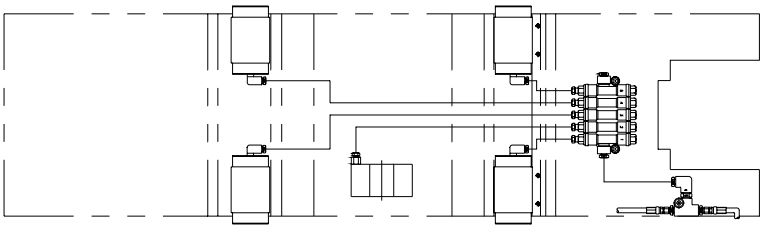
1. Please note to cut power supply when you assemble or repair this machine.
2. Viscosity of the lubricating oil applicable to the machine is 68~1800 cst (#30~40).
3. After finishing the composed system, please make sure that whether the oil delivery is normal or not.
4. We suggest that check the machine parodied if it operated correctly or not, the clean lubricating oil is required to make up when the oil capacity is lower that the minimum point at oil tank.

5. Wash and clean the oil mesh every six months, which can continue the use of the pump as long as possible.
6. Please check power source safety fuse whether is normal or not, when this machine din not power supply (change fuse, if any).
7. The minimum of operation pressure to the machine is 10 kgf/cm^2

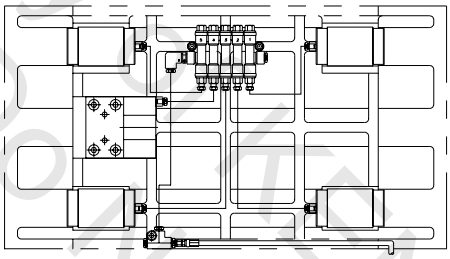
5-2-3 Oil recommendations:

The following drawing is a plate of oil usage recommendation.

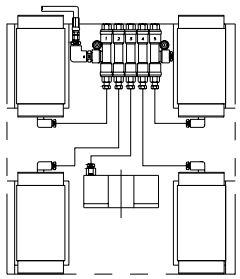
OIL USAGE RECOMMENDATION				
ITEM \ BRAND	MOBIL	SHELL	ESSO	CASTROL
LUBRICATOR OF PNEUMATIC	RARUS 424	CORENA S32	TERESSO 32	HYSPIN VG32 PERFECTO T32
AUTO LUBRICATOR SYSTEM	VACTRA 2	TONNA T68	FEBIS K68	MAGNA BD68
SPINDLE OIL COOLER SYSTEM	VELOCITE 12	TURBO T32	SPINESS O22	HYSPIN VG32 PERFECTO T32



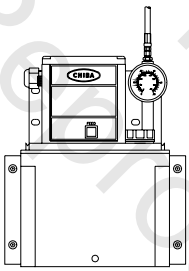
Y AXIS

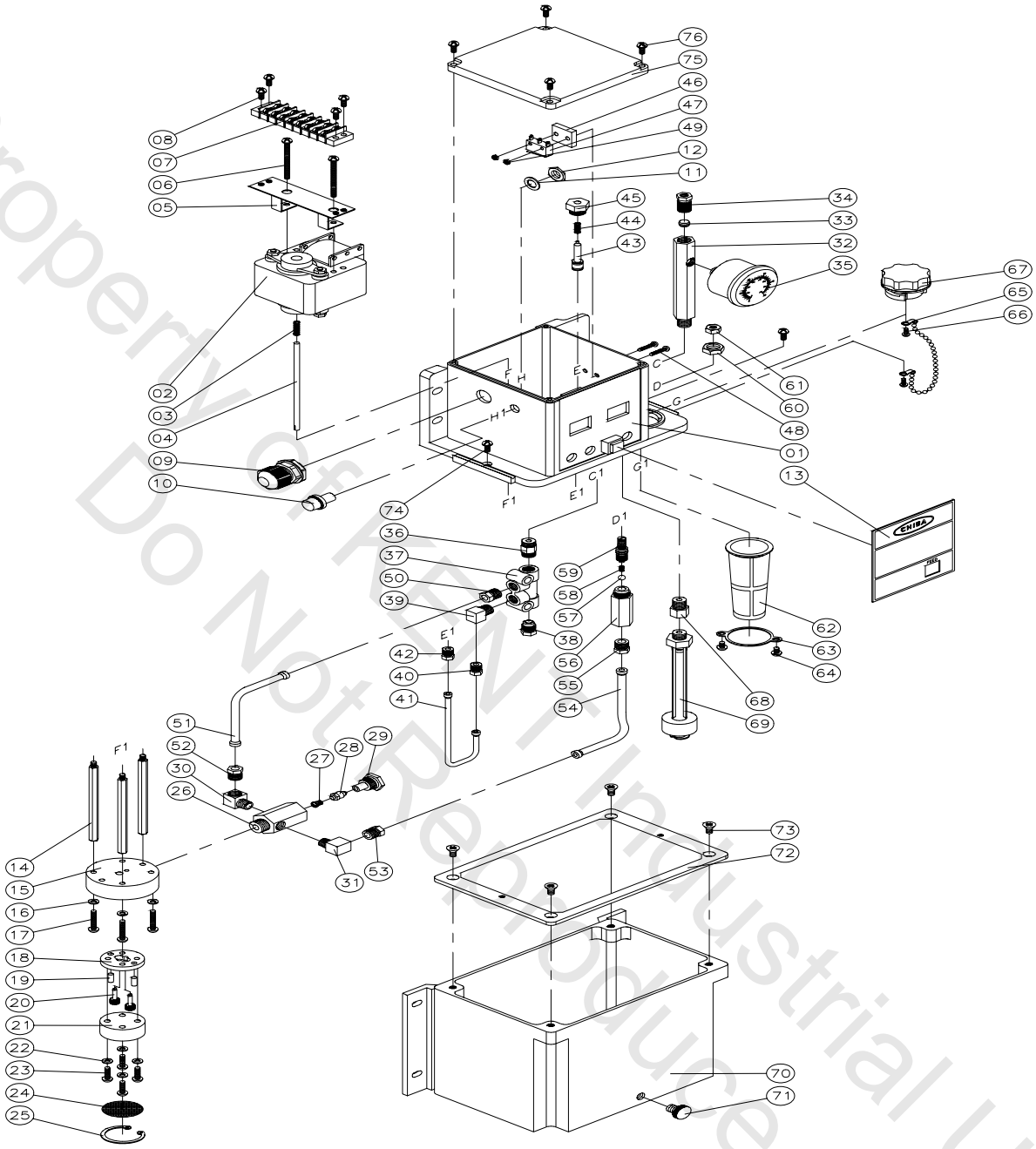


X AXIS



Z AXIS



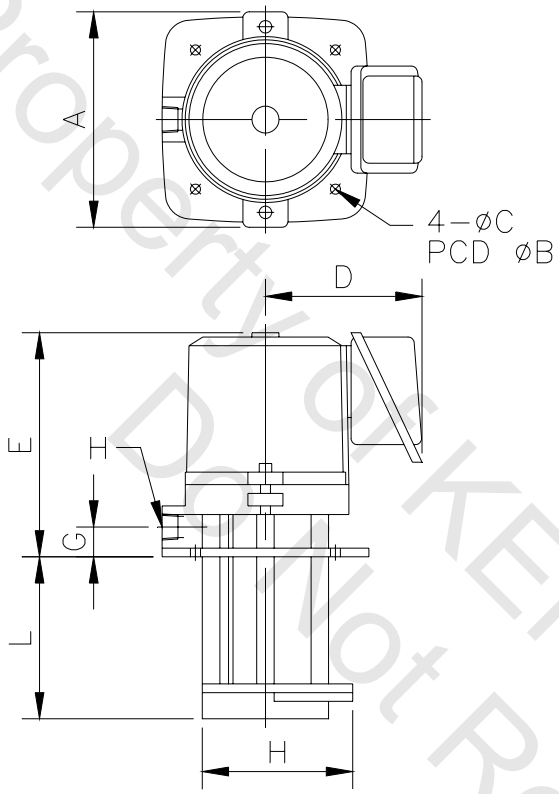


I. Assembling Diagram (Description for Parts Numbering)

	Items	No.	Items	No.	Items
1	Main Body	30	Valve Assembly for Pressure Release	59	PA PB-6
2	Motor	31	Spring	60	Adjusting Seat for Pressure
3	Connecting Spring	32	Umbrella-shaped Non-Return Valve	61	Steel Ball
4	Driving Lever	33	Valve Joint	62	Spring
5	Fixed Sheet for Wiring Plate	34	PH-401 Joint	63	Adjusting Screw
6	Fixed Screw for Motor	35	Ph-401 Joint	64	Nut of Adjusting Seat
7	Wiring Plate	36	Copper Handle for Oil Release	65	Fixed Nut
8	Screw for Wiring Plate	37	PB-6	66	Filtering Net
9	Electric Wire Head	38	PA-6	67	Fixed Ring for Oil Net
10	Electric Wire Head	39	Embedded-style Pressure Gauge	68	Screw for Iron Plate
11	Electric Wire Head	40	PQ-101 Joint	69	Ball Chains
12	Fuse Seat	41	DB-4	70	Screw
13	Fuse	42	PG-006 Plug	71	Nut for Oil Filling Opening
14	Fuse	43	PH-6	72	Extended Handle for 601
15	Fuse	44	PA-6 PB-6	73	Handle of Floating Ball
16	Fuse	45	Aluminum Pipe 6	74	Floating Ball
17	Plate	46	PA-B-6	75	Fastening Ring
18	Support	47	Detecting Rod for Pressure	76	Oil Drum 4 L
19	Tooth Seat	48	Spring	77	Screw for Oil Discharge
20	Washer	49	Nut	78	Relay Plate for Oil Drum
21	Screw	50	Packing Sheet for Micro-switch	79	Fixed Screw
22	Middle Seat	51	Micro-switch	80	Fixed Screw
23	Pin	52	Screw	81	Top Sealing Lid
24	Gear	53	Nut	82	Screw
25	ㄇ-shaped Inlet Seat	54	PA PB-6		
26	Washer	55	Aluminum Connecting Pipe		
27	Screw	56	PA PB-6		
28	Filtering Net	57	PA PB-6		
29	Fastening Ring	58	Aluminum Pipe		

5-2-4 Coolant systems:

5-2-4-1OUTLINE DIMENSION:



TYPE	DV25	
HP	1/4	
A	165	mm
B	158	mm
C	8	mm
D	125	mm
E	180	mm
F	1/2"	
G	24	mm
H	120	mm
L	130	mm

5-2-4-2TECHNICAL DATA:

TYPE	**Large Harbor Dv25-1/4Hp**
Max. operating pressure	2.5 bars (0°C~+40°C) 4.5bars (+41°C~90°C)
Min. inlet pressure	0.5 bar (20°C/50Hz) 0.68 bar (20°C/60Hz)
Liquid temperature range	0°C~+60°C
Max. Ambient temperature	+30°C

5-2-4-3POSITION OF TERMINAL BOX:

a The terminal box can be changed to any one of 0°, 90°, 180°. It is not allowed to be changed by user or owner of this machine.

5-2-4-4PIPEWORK:

a. The pipe should be fitted so that any tension caused by variations in temperature does not affect the pump. A strainer is recommended in cases where solids could enter the suction pipe and block the pump.
b. The pump suction port must be below the lowest coolant level, for the pump is not self-priming.
c. If a hose is used as suction pipe, it must be non-collapsible and every joint of the suction pipe should be completely tight.
d. The discharge pipe should be at least the same diameter as the discharge port of the pump to minimize pressure drop, high flow velocities and noise.

5-2-4-5ELECTRICAL CONNECTIONS:

a. The electrical connections should be carried out in accordance with local regulations.
b. The operating voltage and frequency are marked on the nameplate mounted on pump.
c. The pump must be connected to an external on/off switch.

NOTE:

Never make any connections in the pump terminal box unless the electrical supply has been switched off.

5-2-4-6PHASE OF THE PUMP:

a. Signal-phase motor (1X110/220V, 60 Hz), do not incorporate motor protection and must be connected to an approved motor starter. The other incorporates a thermal overload switch and requires no additional motor protection.
b. Three-Phases motor must be connected to a motor starter, the set nominal current of which must correspond to the electrical data on the nameplate.

NOTE:

1. Do not start the pump at first time using until it has been filled with coolant.
2. Every connection are made as shown on the inside of the terminal box cover.
3. The pump should rotate counterclockwise when viewed from the motor end and arrows on the motor fan's cover indicated the correct direction of rotation.
4. To reverse the direction of rotation, switch off the power supply and interchange any two of inputting supply wire.

5-2-4-7TROUBLESHOOTING:

FAULT	CAUSE
Pump does not start.	Supply failure. Control circuit has cut out or is defective. Motor is defective. Pump is blocked by impurities.
Pump runs but gives no coolant.	Pump is not filled with coolant. Suction or discharge pipe is blocked by impurities. Leakage in suction pipe. Foot or check valve is blocked.
Pump runs at reduced capacity.	Wrong direction of rotation (three-phase). Suction lift is too great. Suction or discharge pipe is blocked. Pump is blocked by impurities. Foot or check valve is partly blocked.
Pump stops during operation.	Thermal overload switch in motor or external motor protection cuts out. Control circuit has cut out.

6 ADJUSTMENTS AND SETTING UP :

6-1 THE ADJUSTMENT OF LIMIT SWITCH AND DOGS:

PRECAUTION:

No matter what kind of setting-up of adjusting job can not be done except a well-trained, authorized, qualified personnel or KENT's service person and local agents. Otherwise, it will cause damage of machine and hazard of people.

6-1-1 The reasons of adjustment and resetting:

a Malfunction in limit switches.

b Some error between software and hardware.

c The original set is not correct.

6-1-2 The procedure of adjustment and resetting:

a Remove the malfunctioned limit switch from either of switch brackets of axes.

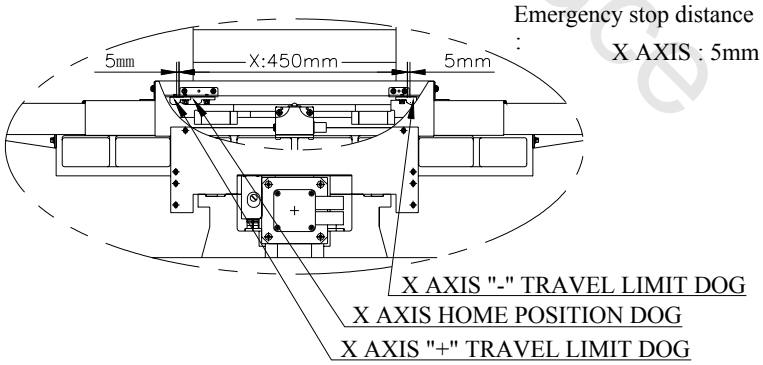
b After changing the limit switch, fix the new limit switch to assure the contact distance between limit switch and both the home dog and the emergency dog is about 2mm.

c The emergency dog is at 10 mm apart from the home dog. (Refer to the drawing)

d Press the MONE START button to check if the home position of the axis is correct or not.

e Check the movement of the max. Travel is as specified. (Refer to the drawing of axes travels) Then add the movement 10 mm more to check if the limit switch contact with the emergency dog or not.

f Check if the limit switch responds correct when it contacts the emergency dog. i.e. when limit switch traveling over the emergency dog, it will cause alarm and stop the machine at once.



	CHECK LIST			
		X	Y	Z
	B	8~10mm	8~10mm	8~10mm
V450	C	450mm	300mm	350mm

6-2 ADJUSTMENT OF TOOL CLAMP AND UNCLAMP OF THE SPINDLE:

The spindle contains a draw bar which clamps and releases tool by release cylinder and the disc spring inside of draw bar. The end of draw bar is made to clamp by six Ø 7 steel balls. When the tool is to be unclamping, the tool release cylinder push down to the draw bar, meanwhile, the steel balls move outward, the tool releases form the spindle cone. The disc spring force will pull the draw bar back to the initial position. On the other hand, during tool clamping, the draw bar is acted downward and clamps the tool by the spring force.

6-2-1 Release for adjustment:

a During tool exchanging, there are malfunction between the upper micro switch and lower micro switch on the top of tool release cylinder.

b The tool pulls hardly out of the spindle cone and cause tool interference.

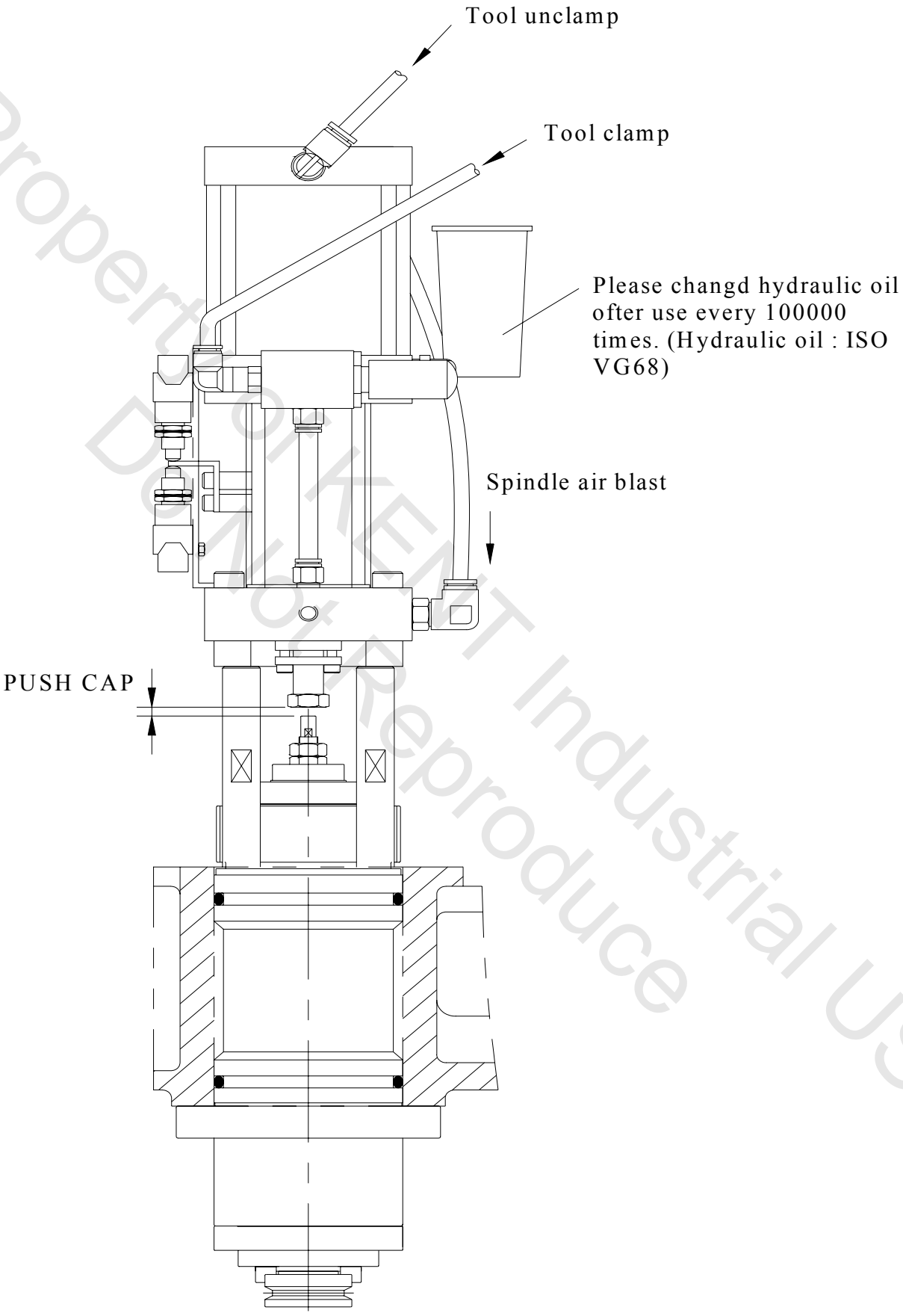
c During tool changing, it is tool unhold for delaying time.

6-2-2 Method of adjustment:

a Use the manual mode to clamp the tool and measure the distance between spindle nose and top flange of tool by thickness gauge. It should be at 0.8 mm. (Refer to the drawing)

b If the distance is not at 0.8 mm, please adjust the push gap by the colt at the bottom of tool release cylinder. Loose the nut and turn the bolt in clockwise to enlarge the gap as long as decrease the gap by turning counterclockwise. (One turn of bolt will move it 1.25 mm)

c Check if the position is correct between the upper limit switch and the dog. Make sure that the limit switch should be contacted with the top point on the dog whenever clamping or unclamping operation. The limit switch should have contact space at 1.5-2.0 mm. It will cause none malfunction or action delay during tool clamping and unclamping. (Refer to the drawing)



6-3 ORIENTATION ADJUSTMENT OF TOOL CHANGER ARM:

6-3-1 Procedure of adjustment

a Z-axis must return to the home position at first.

b Remove the spindle end key or it will cause the danger of collision between arm and spindle.

c Change the parameter NO.485 into manual troubleshooting mode and the data 10000000 into 10110000.

d Press START button step-by-step, let the tool changer arm is at the position lf clamping tool from the spindle.

e Check if the indent between spindle side and arm side are matched or not.

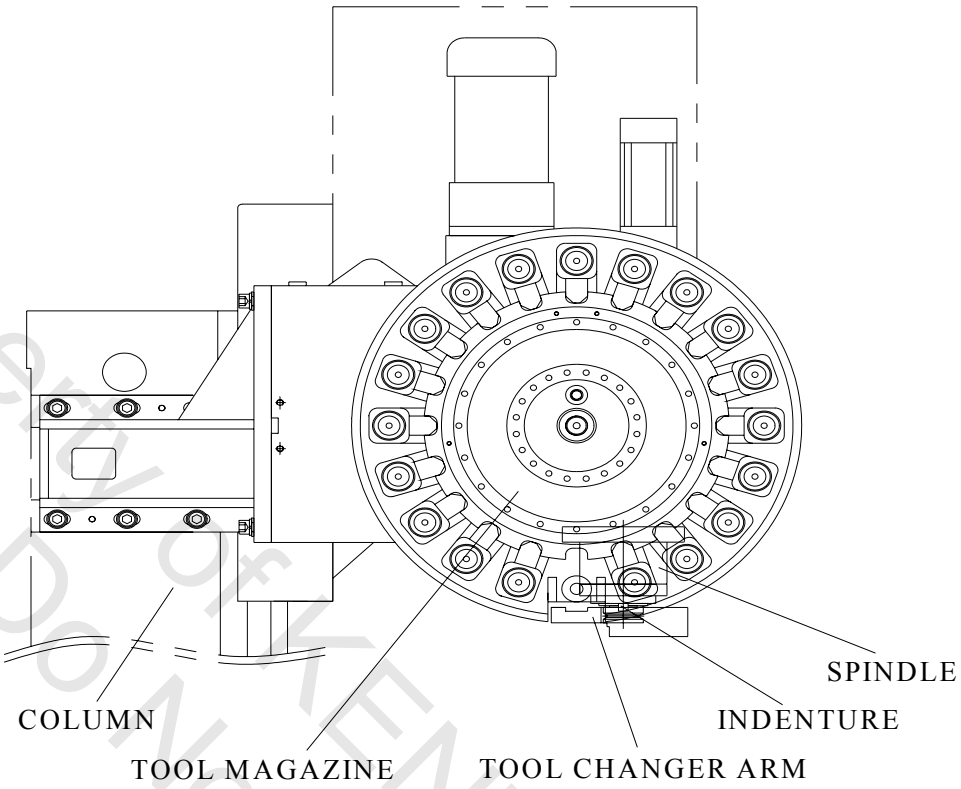
f If not the case as procedure C, call the parameter No. 6577 to modify the pulse of position code till they are matched with each other.

g The compensation code valid when its value of pulse is within ±4095 by adjusting the bolts of the transmission housing of arm.

h Check if the distance between arm and spindle nose is proper matched or not. If not, call the parameter No.510 to modify spindle upward or downward by the compensation code of Z-axis direction till to be perfectly matched.

NOTE:

When the adjustment is fulfilled, turn off the power; then power on again; home positioning and check if the adjustment is just the same as what has been done.



6-4 ADJUSTMENT OF TOOL MAGAZINE UNIT

6-4-1 Two reasons for adjusting tool magazine:

a Change the hydraulic cylinder of tool magazine for its oil leak.

b As the tool magazine disc is not at the exact position so that the tool pocket cannot move normally.

6-4-2 Adjusting procedures:

a Press the MPG button on the operation panel to change into manual mode.

b Take off the round cover of ATC unit to replace the new cylinder.

c Test the tool pocket movement with the M codes of M23 for up and M24 for down.

d It should be a smooth movement for the tool pocket moving up and down to the stopping block while the tool pocket is at the exact position.

e If the tool magazine is abnormally pulled and pushed during the tool pocket moves up and down, adjusting the screw of the cylinder shaft must modify the stroke of the cylinder.

f For the reason b, before taking off the sensor protecting cover for adjusting, please change the key switch on the small magazine panel of the side guard into manual mode first.

g Loosen the setscrew to adjust the conduction area of the sensor block, and then press the CW or CCW button on the magazine panel to test.

h The dwell position of the rollers on the tool magazine disc must be within 60° at a plane

of drive cam during CW or CCW turn.

i Put back the cover and change the key switch on the magazine panel into the AUTO mode.

j After adjustment, use the M6 code to test. Then open diagnosis function to make sure the results. The nodes of ATC sensors on the electrical circuit are as following:

6-5 ADJUSTMENT OF TOOL CHANGER ARM

6-5-1 Two reason for adjustment:

a Because of improper position of tool changer arm results it hardly whole the tool.

b The locking retainer of tool arm fails because of abrasive wear, that the arm cannot hole the tools tightly.

6-5-2 The procedure of adjustment:

A. Make the spindle oriented and Z axis returned to home position.

B. Change the operation mode to MPG and the parameter to stepping move mode and put some tools into the tool pockets.

C. Apply the M23 code to move the tool pocket to the ready position for tools changing.

D. Let it move by the stepping mode and check if the tools can be moved into both the spindle cone and tool pocket smoothly.

E. If there is a small error happened, loose the set bolts of the lock collar and adjust to the correct position （Refer to the item 10, 11 of the drawing）, then tighten it again by the torque wrench with 200 lb-ft.（Notice the process of tightening bolts should be diagonal and in order. ）

F. Change the operation mode from step move to auto mode, then take off the arm from the center shaft on the item 4 to check it.

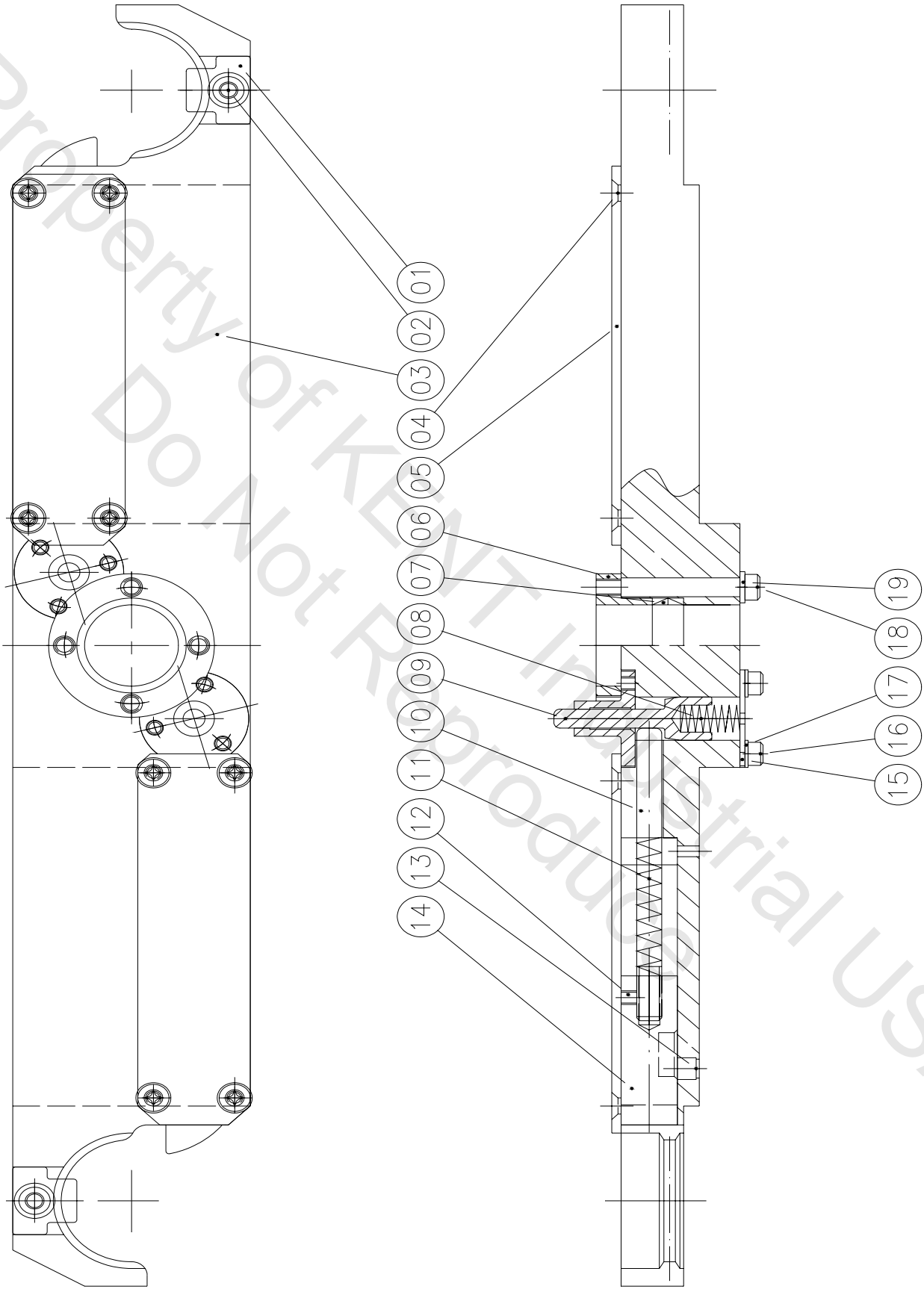
G. For the reason b, after loosing the setscrews on item 8, open the side cover of the arm on item 20, at the same time, hole the tool retainer on item 6 to avoid it jerked out.

H. Take off the fixed pin on item 16, lock pin on item 3, spring bracket on item 2, 12, 13 and the tool retainer on item 6 to check the slide way. If there is any burr found in the slide way or tool retainer, relieve them by grinder.

I. Put back those parts into their portion and ensure they are moved smoothly.

J. After setting down, let the arm grip a tool. Then by shoving the tool toward the direction of tool retainer and check that the movement of tool retainer is within 0.5 mm.

K. If the movement of tool retainer is smaller or larger, please get the local agents or KENT service to fix. Do not change or touch anything casually by user.



7 CLEAN AND MAINTENANCE

CAUTION:

a Shut off the power before doing any maintenance or cleaning job and obey the instruction or you might be hurt.

b Any clean or maintenance concerned with removing must be careful and only well-trained personnel can do it.

7-1 DAILY MAINTENANCE:

7-1-1 Before power on:

A. Inspect if the power cable and external cable are normally connected and the voltage capacity is matched as machine required.
B. Check if there is oil or coolant leakage on the hydraulic or coolant pipes.
C. Check if there are enough oil for the hydraulic unit, lubrication unit and coolant unit.
D. Check if the pressure gauges of hydraulic unit and pneumatic unit were indicated to zero position.
E. Check if the auto tool changer unit is at the normal position.

7-1-2 After power on:

A. Check if there is alarm message after NC power on.
B. NC should bee ready to execute the program.
C. All the running components should be run at normal condition without noise.
D. The pressure gauge for pneumatic system should be at 6 kg/c m^2
E. The pressure gauge for oil-air lubricator system should be at 0.5~1 kg/cm2.
F. The lubricant should flow out to the slide ways.
G. The wipers on the telescopic covers should be cleaned from the chips.
H. Test tool-changing unit and make sure the unit can work smoothly.

7-1-3 After finishing daily work:

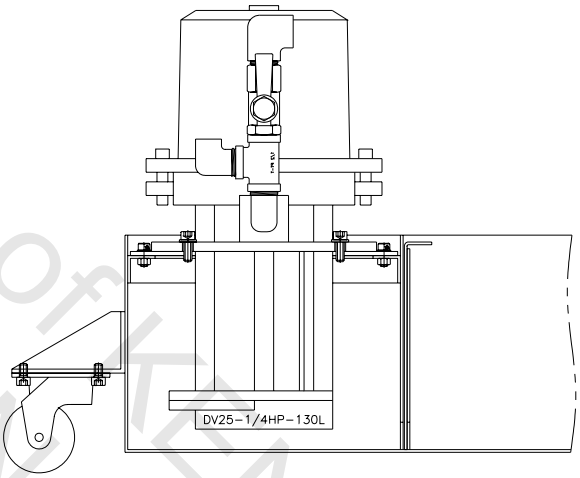
A. Inspect the oil level of auto lubricator tank to refill up, if it is necessary and is consumed.
B. If there is water or dirt in the tank, relieve and change fresh oil.
C. Check the level of coolant to refill up and blush the coolant pump through with clean

water if there is impurities after use.

D. Clean the chips on the chip tank, conveyor, and tool tip and tool magazine.

E. Remove and centralize the chips on the chip bucket out side of the shop.

F. The coolant pump which is not being used during periods frost should be drained（shown as the following sketch）or it will be harmful for pipe and pump. Take off the priming plug P and drain plug V for draining.



G. Turn off working light, power supplies and draw out the connector of power cable whenever finishing work.

7-2 WEEKLY MAINTENANCE:

A. Clean fan net of heat exchange on electrical cabinet.

B. Clean fan net of spindle oil cooler..

C. Clean the motor fan of chip conveyor.

D. Clean the filter net inside of coolant tank.

E. Clean ATC motor fan and the brake of surrounding motor.

F. Fill the grease for the warm gear of ATC transmission unit.

7-3 SEMIANNUAL MAINTENANCE:

A. Check and re-adjust the machine level and static accuracy.

B. Inspect the home position and reset, if necessary.

C. Ensure there is enough of lubricant on the slide way, gear of reducer and change or refill the fresh oil, such as lubricant, hydraulic oil, oil cooler tank, etc.

D. Inspect the backlash of ball screw on three axes.

E. Inspect the repetitive accuracy and geometric accuracy of machine.

F. Replace the fan net of heat exchanger on electrical cabinet.

G. Replace the element of filter on accessory parts.

H. Clean the electric motor outside and turn off the power at first.

I. Before cleaning the chip or dirt on the conduction block of sensor and magnetic switch, turn off the power.

J. Check the smooth function of all limit switches for axes and clean the dirt or re-adjust the position, if necessary.

7-4 ANNUAL MAINTENANCE:

A. Follow the same procedures as mentioned above semiannual maintenance.

B. Replace the hydraulic oil and oil filter according to the oil recommendation.

C. Replace the filter for auto lubricator and clean the lubrication tank, coolant tank.

D. Do not pour put the wasting oil or coolant liquid casually. It'd better remain in oil bucket periodically and send to the authorities concerned of shop to do with it.

ENVIRONMENTAL CLAIMS:

God creates this world and gives human being the rights to rule over the earth. KENT, a part of this family shall have responsibility and duty to keep the earth away from damage or pollution during producing. We all obey the laws and regulations through our policy of quality control management and concept of environmental protection issue. We have been devoted ourselves on the environmental management system no matter at work or in life. It is our final destination that to make a sustainable development business and to provide a pure clean environment to the generations.

OUR GOAL:

1. RESOURCES RECOVERY: Not only check devices periodically and save the resources but reuse the recyclable resources and develop new less-polluted resources.
2. REDUCING WASTE: Specific and recycle the waste and reduce the quantity of waste.
3. WATER CONTROL: Inspect the water, wastewater drained off to the sewage treatment plant through our sanitary sewer.
4. AIR CONTROL: Reduce air pollutants, obey the laws about emissions standard of air pollution, remain a high quality and all devices are in good condition.

WASTE TREATMENT:

1. DURING OPERATION:

A. Waste oil: There is any leakage of oil or liquid during operation machine, stop and check machine. Meanwhile report to your supervisor or manager to solve. The

waste oil, solution or liquid must pour into the stored bucket at plant or follow the rules and procedures of waste treatment of your own control measures. It can not be poured out at random and not be allowed draining down through sewer.

B. Cutting Chip: Some of the cutting chips are able to recycle, after machining, the chips must separate and restore by material. It is must be placed and treat according to the environmental regulations of local plant.

C. Toxic gas: Check the concentration of exhaust emissions and the emission equipments. Control the value to standard request every cyclic inspection.

2. AFTER OPERATION:

A. Waste Machine: When machine is out of order can not be fixed, separate themachine to pieces by material. Some of the material can be recycled such as casting iron, steel, metal, etc.. Some of them can not be reused such as cables, electrical parts,motors, PCB board, etc.. Store the same parts according to their material to do with local dealer or the procedures of waste treatment on your own.